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JANUARY 1910.

REPORT ON LOGGING AND LUMBERING OPERATIONS IN  
HOLEB, FORSYTHE, AND LOWELL TOWNSHIPS, SOMER-  
SET COUNTY, MAINE.

BY

J. R. BRUBAKER

I. T. YARNELL.

JANUARY 1910.  
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BY  
J. R. BRUBAKER  
I. T. YAMMUN.

This report of the methods of logging and lumbering is the result of an investigation in Somerset County, Maine, by J. R. B. , and I. T. Y., as required of the Senior Forestry class, of the P. S. C., in order to familiarize them with the practical methods of lumbering.

Most of the information was obtained at the camps of the G. N. P. Co., while the remaining portion was secured at the Hollingsworth and Whitney camps.

### I. GENERAL FOREST REGION.

Somerset County is situated in the northwestern part of Maine, west of Moosehead Lake and north of the Rangle Lakes . In genral the topography of the region is very rough, being broken up by many hills and ridges. The many lakes and ponds in the region are drained southward into the Kennebec River. Much swampy lands occur around and near the lakes and ponds. The thin layer of soil is of glacial origin, while numerous boulders of large size are scattered over the region. Indeed considerable portions of it is little more than ledges and piled up rock. The elevation of this region is 1100-1200ft.

The climate is characterized by long cold winters and short summers. The temperature in the winter time often falls to 20 or 30 degrees below zero. In the latter part of October the snow begins to fall and continues till well into the spring. The snow fall continues throughout the winter; several inches is added from time to time and by the end of March it reaches a depth of 5 or 6 ft.



This report of the methods of working and determining is the result of an investigation in Somerset County, Maine, by J. R. B. and I. T. Y., as required of the Senior Forestry class, of the P. S. C., in order to familiarize them with the practical methods of land surveying.

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### 1. GENERAL FOREST REGION.

Somerset County is situated in the northwestern part of Maine, west of Moosehead Lake and north of the White Mountains. In general the topography of the region is very rolling, being broken up by many hills and ridges. The many lakes and ponds in the region are drained, some of them, to the Penobscot River. Many swampy lands occur around the lakes and ponds. The thin layer of soil is of glacial origin, while the rocks are of various sizes and are scattered over the region. Indeed, granitic portions of it are little more than boulders and piles of rock. The elevation of the region is 100-1500 ft.

The climate is characterized by long cold winters and short summers. The temperature in the winter is often below 20 or 30 degrees below zero. In the latter part of October the snow begins to fall and continues till well into the spring. The snow will continue throughout the winter; several times it is melted from the tops of the hills and of the mountains.

## HISTORY OF LUMBER INDUSTRY IN THE REGION.

At one time red pine was the most valuable tree in this region; but at the present time little of this specie is found, owing to the fact that about 60 years ago the region was lumbered for this tree. Judging from the size of the stumps left standing, which are well preserved, the trees were of a large size. No second growth of red pine came in.

The best spruce was not taken out at this time; but a few years later they began to cut the spruce and fir. At present only second growth timber is found. The pine, spruce, and fir were all driven to the mills on the lower Kennebec River.

The first mill in this region was built in 1896 on the island in Holeb Pond, then it was moved to Holeb along the Moose River. This mill was built to saw up the most valuable hardwoods in this region. Beech, Birch, and Maple were cut. It was run for a year or two at this place and when the land was sold to the G. N. P. Co. in 1900, it was dismantled.

One of the great difficulties of logging in this region was the securing of necessary supplies which had to be toted in from Megantic. This difficulty was overcome by the completion of the Canadian Pacific R. R. Surveys for this railroad were made as early as 1882; but it was not completed until three or four years ago. At present supplies are toted in from Holeb and Jackman, a distance of 4 to 8 miles to the different camps.

Some of the primitive methods of logging are still in use, especially in the small jobbers' camps. Many of the small operations are done by farmers who, with their families and

## HISTORY OF LUMBER INDUSTRY IN THE REGION.

At one time red pine was the most valuable tree in this region; but at the present time little of this species is found, owing to the fact that about 50 years ago the region was lumbered for this tree. Judging from the size of the stumps left standing, which are well preserved, the trees were of a large size. No second growth of red pine came in.

The best spruce was not taken out at this time; but a few years later they began to cut the spruce and fir. At present only second growth timber is found. The pine, spruce, and fir were all driven to the mills on the lower Keweenaw River.

The first mill in this region was built in 1850 on the island in Little Pond, then it was moved to Wolf Lake along the Moose River. This mill was built to saw the most valuable hardwoods in this region. Beech, birch, and maple were cut. It was run for a year or two at this place and when the land was sold to the G. N. P. Co. in 1900, it was dismantled.

One of the great difficulties of logging in this region was the securing of necessary supplies which had to be hauled in from Wagonier. This difficulty was overcome by the completion of the Canadian Pacific R. R. Surveys for this railroad were made as early as 1882; but it was not completed until four years later. At present supplies are hauled in from Wagonier and Jackson, a distance of 400 miles to the different camps.

Some of the primitive methods of logging and mill in use, especially in the small "portage" camps, have been abandoned. Operations are now by means of skidders and log skidders, and



horses, move to the camps during the logging season. These jobbers employ two to four horses and one or more cutting crews. The "scoote" a crude one horse sled-like arrangement, for skidding logs, is still in use by these small jobbers. The greatest progress in logging is in introducing more efficient camp equipment. The steam log haulers are now used in some camps for long hauls, where the roads will permit.

One of the oldest mills is still in operation. It is a water-power gang mill; built at Bangor. But this is more of a relic of older times, as modern mills are supplanting them. An example of a modern mill is the one at Long Pond.

Since its settlement, Maine has always had a lumber business, that is to say, lumber has been cut and sawed here; not only for local consumption, but to export to other communities. The development of the lumber business has proceeded according to evident laws. In the natural condition, pine was at once the largest, most valuable, and most accessible timber that the state possessed. Pine therefore was the first timber to be taken out. It was taken too, where most accessible, along the coast and on the banks of the rivers, from where it could be easily floated to the mills. Pine was taken out even at remote distances, and the land was culled for pine before there was a profitable market for other softwood timber. Finally in 1840, the limit of pine was reached and spruce took its place as the staple lumber export. Beginning about 1870, in a small way, pulp and paper manufacture rapidly increased and in 10 years had become well established. After a period of experimentation,

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interior, and in fact was the chief lumber of the early  
profitable years of the lumber business. The early mills,  
the first of which were located and worked along the coast  
to supply lumber exports. Beginning about 1850, in a small way,  
the mills moved inland, and the lumber business was in the  
advent of its decline. After a period of expansion, the

spruce wood was settled upon as by far the best technically for most uses, and it is now almost exclusively used in many mills. Paper making is a growing industry in this country and is mainly dependent upon spruce wood, this is especially important to Maine because it possesses the largest stock of spruce wood existing within the U. S.

A large part of Maine is destined to remain wooded. This is especially important for the future lumber supply, because it is readily accessible to many good markets in the East and has excellent natural conditions for the growing of timber trees.

## II. TIMBER LANDS IN THE REGION.

The forest in Haleb, Forsyth, and Lowell Townships is a mixed forest, of conifers and broadleaved trees, with the conifers predominating. The commercially important tree is the red spruce, *Picea rubens*.

As there has been repeated cutting for the last 60 years, the stands are not as fully stocked as they were in the virgin state; in fact the stands do not yield more than 3000 - 5000 board-feet per acre. Gore Township has 10000 acres of timber land with an average of 10000 board-feet per acre. It is owned by the Berlin Mills Co. and it is probably the best stand in the state. They consider 20,000,000 board-feet to a township as a very good stand.

The principle species are;

|             |                                |
|-------------|--------------------------------|
| Red Spruce  | ( <i>Picea rubens</i> ).       |
| Balsam Fir  | ( <i>Abies balsamea</i> ).     |
| Arbor-vitae | ( <i>Thuja occidentalis</i> ). |



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## II. TIMBER LANDS IN THE REGION.

The forest in Idaho, Oregon, and Lowell townships is mixed forest, of conifers and broadleaved trees, with the conifers predominating. The commercially important tree is the red spruce, *Picea rubra*.

As there has been repeated cutting for the last 50 years, the stands are not as fully stocked as they were in the virgin state; in fact the stands are not as full as they were 5000 - 6000 years ago. The townships have 10000 acres of timber land with an average of 10000 board-foot per acre. It is owned by the Berlin Mills Co. and it is probably the best stand in the state. They consider 20,000,000 board-foot as a township very good stand.

The principal species are:

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|------------|--------------------------------|
| Red Spruce | ( <i>Picea rubra</i> ).        |
| Balsam Fir | ( <i>Abies balsamea</i> ).     |
| Arbutus    | ( <i>Thuja occidentalis</i> ). |



|                      |                       |
|----------------------|-----------------------|
| White Birch          | (Betula populifolia)  |
| Yellow Birch         | (Betula lutea)        |
| Aspen (White Poplar) | (Populus tremuloides) |
| Beech                | (Fagus americana)     |
| Maple                | (Acer saccharum)      |

One specimen of the jack-pine, *Pinus banksiana*, was found on the shore of Holeb Pond. This is about the southern limit for this specie. It is not an important tree commercially.

The greater part of the forest lands are owned by coporate interests, these are in large holdings. All the land is not held by the lumbering interests; but some is owned by private concerns, who lease the right to cut lumber, to the lumber companies.

During the Civil War, owing to the fact that the State of Maine needed money, she sold thenothern part of her public lands for \$.32 - .33 per acre. In 1896 H. & W. bought Misery Township for \$3.50 per acre. These were the only figures we could obtain, relating to stumpage prices.

The large lumbering concerns are only too willing to practice Forestry if it will be proven to them that it will increase their wood product and be a paying proposition. Certain phases of forestry are practical; but more conservative methods of lumbering could be followed.

### III. PARTICULAR TRACT STUDIED.

The typical forest of this region was found around Big Turner Pond. The stand occurred in a mixture of conifers and hardwoods, with the conifers predominating. The different

(Balsam poplar)

(Betula lutea)

(Populus tremuloides)

(Fagus americana)

(Acer saccharum)

White Birch

Yellow Birch

Aspen (White Poplar)

Beech

Maple

One specimen of the Jack-pine, Pinus banksiana, was found on the shore of Lake Umbagog. This is about the southern limit for this species. It is not an important tree commercially. The greater part of the forest lands are owned by corporate interests, these are in large holdings. All the land is not held by the lumbering interests; but some is owned by private concerns, who lease the right to cut lumber, to the lumber companies.

During the Civil War, owing to the fact that the State of Maine needed money, she sold the northern part of her public lands for \$32 - 33 per acre. In 1861, W. W. Wood sold Misisse Township for \$2.50 per acre. These were the only times we could obtain, relative to stumpage prices.

The large lumbering concerns are only too willing to practice forestry if it will be proven to them that it will increase their wood product and be a paying proposition. Certain phases of forestry are practical; but more conservative methods of lumbering could be followed.

### III. PARTICULAR TRACT STUDIED.

The typical forest of this region was found along the Turner Pond. The stand occurred in a mixture of conifers and hardwoods, with the conifers predominating. The different

species occur in the following percentages:

|              |               |
|--------------|---------------|
| Red spruce   | 50%           |
| Balsam fir   | 35%           |
| Yellow birch | 10%           |
| Arbor vitae  | 4%            |
| White pine   | 1%            |
| Total        | -----<br>100% |

The G. N. P. Co. being engaged in making paper pulp, pays more attention to the harvesting of spruce and fir; white pine and arbor vitae are taken out and sold for shingles and lumber products; and yellow birch is left standing in the forest.

The present stand is a second growth forest, which is the result of former cuttings. The stand is a two-story forest.

In this region no care need be taken for reproduction for after cutting, spruce and fir comes up in thick stands with the fir predominating, provided fire is kept out of the tract. On burned over areas, white birch and poplar immediately take possession of the soil, in about equal percentages. The ravages of insects and fungi are not felt in this region and no attention is paid to them. The greatest enemy to the forest are fires which almost invariably follow the cuttings.

In the fall of 1908 a large area in Holeb and Forsythe Townships was burned over by fire which originated from sparks from the engines of the C. P. R. R. This fire was partly a ground fire and partly a crown fire and leaped from ridge to ridge without injuring the intervening valleys. The G. N. P. Co. brought suit for damages incurred in this fire; but the R. R.



species occur in the following percentages:

|              |      |
|--------------|------|
| Red spruce   | 30%  |
| Balsam fir   | 25%  |
| Yellow birch | 10%  |
| Arbor vitae  | 4%   |
| White pine   | 1%   |
| Total        | 100% |

The G. N. P. Co. being engaged in making paper pulp, pays more attention to the harvesting of spruce and fir; white pine and arbor vitae are taken out and sold for sawmills and lumber products; and yellow birch is left standing in the forest. The present stand is a second growth forest, which is the result of former cuttings. The stand is a two-story forest. In this region no care need be taken for reproduction for after cutting, spruce and fir comes up in thick stands with the fir predominating, provided fire is kept out of the tract. On burned over areas, white birch and poplar immediately take possession of the soil, in about equal percentages. The ravages of insects and fungi are not felt in this region and no attention is paid to them. The greatest enemy to the forest are fires which almost invariably follow the cuttings.

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Company, thinking this claim was too high are now having an accurate estimate made of the burned timber. The dead timber left by the fire was afterwards blown down by the wind. The work at camps No. 1. and No. 2. consists of removing this mass of fallen timber. This proved to be a difficult task and had to be done before the snow became too deep.

The region is so rough and the conditions are such that it is not practicable nor profitable to leave any merchantable timber. To leave separate seed trees would mean entire loss by windfall. Climatic and soil conditions are not favorable for planting, nor is it necessary, for the natural reproduction is all that can be desired.

Tops or crowns might be looped to the advantage of reproduction and to lessen the danger of fire. The principal thing for the Forester to do is to stop all leaks in the business; keep the stumps as low as possible ;; see that all the timber is taken out, and none left in the woods; attend to the removal of all dead and fallen timber; and to improve the methods of lumbering wherever possible. The Foresters hired by the Company are endeavoring to accomplish these results.

The only fire protection furnished is that done by the state of Maine. Fire wardens are employed, notices are posted, and lookout towers are erected on prominent ridges, by the state. The different logging companies do not patrol their tract; but post warnings against setting fire to their woods, and call out their men to fight fires. Doubtless it would be a

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The only first protection furnished is that done by the  
 state of Maine. Fire wardens are employed, houses are posted,  
 and lookout towers are erected on prominent ridges, by the state.  
 The different logging companies do not patrol their tracts;  
 out posts are maintained against cutting fire in the woods, and  
 call out their men to fight fires. Doubtless it would be



paying proposition for the company to employ fire wardens during the dangerous seasons, especially when hunters and fishermen are roaming the woods.

The G. N. P. Co. has part of its logging done by contracts. These are let to large contractors who sub-let to small jobbers.

At Peppin's camp the logs had to be drawn-on over a road about a half mile long, at a cost of \$5.00 per M. He received \$5.75 per M. for all logs delivered at Big Turner Pond. Mr. Newton of Jackman the original contractor received \$6.00 per M. He therefore made \$0.25 per M. and had no money invested. He was only responsible for the delivery of the required number of bd. ft.

#### NOTICE.

THE FOLLOWING REGULATIONS MUST BE CAREFULLY OBSERVED BY ALL EMPLOYEES CUTTING ON LANDS OF THIS COMPANY.

1. Roads must be swamped wide enough to allow the free passage of loads over them, AND NOT WIDER than twenty-five feet except when necessary in making turns.
2. Timber for bridges, corduroy and skids of all sorts must, when possible, be of hemlock, hardwoods, fir, or other unmerchantable material.
3. Scattered trees must be cut as they are met with in the regular course of cutting.
4. Any stick sound at both ends, ten (10) feet long or over, and five (5) inches or over in diameter at the small end shall



paying proposition for the company to employ fire wardens during the dangerous seasons, especially when hunters and fishermen are roaming the woods.

The G. N. P. Co. has part of its logging done by contractors. These are let to large contractors who sub-let to small jobbers.

At Phipps' camp the logs had to be drawn on over a road about a half mile long, at a cost of \$5.00 per M. He received \$5.75 per M. for all logs delivered at Big Turner Pond. Mr. Newton of Jackman the original contractor received \$6.00 per M. He therefore made \$0.25 per M. and had no money invested. He was only responsible for the delivery of the required number of bd. ft.

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2. Timber for bridges, corduroy and skids of all sorts must, when possible, be of hemlock, spruce, or other unseasonable material.
3. Scattered trees must be cut as they are met with in the regular course of cutting.
4. Any stick sound at both ends, ten (10) feet long or over, and five (5) inches or over in diameter at the small end shall

~~shall~~ be considered a merchantable log.

5. When logs are being cut ALL SPRUCE TREES TWELVE (12) INCHES AND OVER IN DIAMETER BREAST HIGH AND CONTAINING A MERCHANTABLE LOG MUST BE CUT. ALL FIR TREES EIGHT (8) INCHES AND OVER IN DIAMETER BREAST HIGH AND CONTAINING A MERCHANTABLE LOG MUST BE CUT.

6. NO TREES OF ANY DIAMETER SMALLER THAN THAT SPECIFIED SHALL BE CUT<sup>ed</sup>, excepting when absolutely necessary in swamping roads, yards, landings, etc.

7. All merchantable logs contain<sup>ed</sup> in undersized trees which have to be swamped from roads, yards, landings, etc., must be hauled.

8. All dry spruce containing a merchantable log must be cut.

9. TREES MUST BE CUT DOWN AT A POINT NEVER HIGHER THAN THE SWELL OF THE ROOTS and never higher than 10 inches above ground except when rotten butted.

10. Snow must be shoveled from the bases of trees to permit cutting at the specified height.

11. Whenever possible the saw must be used in felling and cutting up trees.

12. Trees must be thrown so that the fewest possible undersized trees will have to be cut to get the log or logs out.

13. In butting off, merchantable material must not be left in butts.

14. ALL TREES MUST BE RUN TO A DIAMETER OF FIVE (5) INCHES IN THE TOPS WHEN THE TOPS ARE SOUND. If not sound, trees must

shall be considered a merchantable log.

5. When logs are being cut all spruce trees twelve (12) inches and over in diameter breast high and containing a merchantable log must be cut. All fir trees eight (8) inches and over in diameter breast high and containing a merchantable log must be cut.

6. No trees of any diameter smaller than that specified shall be cut, excepting when absolutely necessary in standing roads, yards, landings, etc.

7. All merchantable logs containing <sup>50</sup> in undressed trees which have to be swamped from roads, yards, landings, etc., must be headed.

8. All dry spruce containing a merchantable log must be cut.

9. Trees must be cut down at a point never higher than the

stump of the roots and never higher than 10 inches above

ground except when rotten butted.

10. Snow must be shoveled from the bases of trees to

permit cutting at the specified height.

11. Whenever possible the saw must be used in falling and

cutting up trees.

12. Trees must be felled so that the lowest possible and

skewed trees will have to be cut in getting the log on the cut.

13. In cutting off, merchantable material must not be left

in butts.

14. All trees must be run to a diameter of five (5) inches

in the tops when the tops are sound. If not sound, trees must



be topped at the point where they are sound.

15. No trees must be left lodged.

16. Short logs must be cut when groups of undersized trees will have to be cut to get long logs out.

17. Trees containing merchantable logs must not be cut up in such a way that they, or any part of ~~them~~, become too short to haul or make them unmerchantable.

18. Yards must be cut back only as fast as space is needed, and must never be wider than necessary.

19. Head blocks or bed pieces for yards may be of any kind of timber, but if of merchantable material, must be so laid that all of them can be hauled off at the proper time.

20. Yards must be so made that logs at the bottom will not be covered by snow thrown from the top.

21. Logs spilled from yards or sleds when being loaded onto wagon sleds must be picked up at once.

22. All merchantable logs must be cleaned from yards as heuling off progresses. Odd logs and merchantable bed pieces or head blocks must not be left to be cleaned up later.

GREAT NORTHERN PAPER COMPANY.

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15. No trees must be left lodged.

16. Short logs must be cut when ropes of unskinned trees

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to haul or make them in merchantable.

18. Yards must be cut back only as far as space is needed,

and must never be wider than necessary.

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of timber, but if of merchantable material, must be so laid

that all of them can be hauled off at the proper time.

20. Yards must be so laid that if the bottom will not

be covered by snow or rain from the top.

21. Logs spilled from yards or slips will be hauled off to

where on slips must be piled up at once.

22. All merchantable logs must be of such length that they

will haul off properly. Odd logs of merchantable bed pieces

or head blocks must not be left to be cleared up later.

GREAT NOTIERN PAPER COMPANY.

## The laying out Woods Operation:

The method of estimating is mainly by timber cruisers, who base their estimate on experience gained by living the greater part of their life in the woods. They use their own judgement for estimating different stands, conditions, etc. They may or may not make a count of a plot of trees or all the trees on the tract. More careful estimates have been made of some of the holdings of the G. N. P. Co. An example of this was the estimate of Mr. Weston who ran a township survey. He then laid off lines, one half mile apart, on the boundary line. On these lines he took circular plots of 60 ft. radii which equals about one fourth of an acre. He considers this method superior to the strip method, especially in the Maine woods.

The "log run" is about 12 to 15 logs to the M. bd. ft. for spruce; this makes the average log about 70 bd. ft. This average is lower than formerly owing to repeated cutting and fires.

The chief objects in planning the woods operation and locating or building the camps are; amount of timber to be taken out by the camp, and time in which it is to be done. These two facts determine the size of the crew and number of horses to be employed. The camp site is located near the center of the operation and yet conveniently located for a good water supply. These facts are determined by the camp foreman (or "walking boss"), who lays out the main roads and selects the site for the camp. This is done in the fall before the cutters

The method of estimating is

mainly by timber cruisers, who pass their estimate on to the foreman gained by living the greater part of their life in the woods. They use their own judgment for estimating different stands, conditions etc. They say or may not make a count of the trees on all the trees on the tract. More careful estimates have been made of some of the holdings of the G. W. P. Co. An example of this was the estimate of Mr. Weston who ran a town-ship survey. He then laid off lines, one half mile apart, on the boundary line. On these lines he took cross-sections out of 60 ft. radii which were about the fourth of an acre. He considers this method superior to the strip method, especially in the Maine woods.

The "log run" is about 12 to 15 logs to the "bd. ft." for spruce; this makes the average log about 70 bd. ft. This average is lower than former ones owing to repeated cutting and fires.

The chief objects in planning the woods operation are locating or building a camp and; amount of timber to be taken out by the camp, the time in which it is to be done. These two facts determine the size of the road and number of horses to be employed. The camp site is located near the center of the operation and yet convenient to the logging. The site is determined by the camp foreman (or "walking boss"), who lays out the main roads and selects the site for the camp. This is done in the fall before the cutting



arrive on the scene. These plans are necessarily rough; but are faithfully carried out and good results are obtained.

The State of Maine is laid off in townships, 6 miles square. Later the G. N. P. Co. had this tract re-surveyed and laid off in sections one mile square. The boundaries are blazed and wooden monuments, bearing the range line and location of the section, are erected at the corners of each section.

The maps of the region shows the location of streams ponds, and lakes and important ridges or mountains, main roads, trails, camps, and burned area. These maps are kept up to date to show the area cut over, change in roads built and to show any burns that may occur. It is the aim in the location of the camp to have it as near the cutting operation as possible; but in some cases this is almost entirely lost sight of. At one of the H. & W. camps the work had progressed until now the men were cutting at least three miles from the camp. Judging from this the company considers it cheaper to have the men work this distance each day than to erect new camps. But it is only a question to our minds whether the time and energy consumed by the men in going to and from work is commensurate with the cost of erecting a new camp. This would be entirely feasible for the cutting of small and isolated tracts.

For each camp an area of about three acres is cleared. Everything is cut clear and the area is burned over to prevent any danger from fire. All the buildings are constructed from round logs, and little sawed lumber is used except for doors, table tops, and window casings. The logs are made to fit as

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any danger from fire. All the buildings are constructed from  
round logs, and little sawed lumber is used except for floors,  
table tops, and window casings. The logs are used for the

snug as possible by notching near the end. The crevices between the logs are filled with moss and clay; in the better camps they are cemented. The roof is made of split logs and then covered with tar paper.

Camp No. 1. of ~~the~~ <sup>the</sup> G. N. P. Co. is a typical camp of this region and is the one we selected for our study of camp equipment and camp life. The following buildings, composed this camp; cook-house and men's camp, stable, blacksmith-shop, filers room, office and storage shed.

The time required to build such a camp is figured at 10 days from the time the first tree is felled until the men occupy the buildings. The entire crew of 45 men and 3 teams of horses are used in order to complete the work in this time. No account is kept of the timber used and the cost is reckoned on the wages and food supplies of the men and horses. This would amount to \$816.00.

|  |                |
|--|----------------|
| Wages of men (45 men, \$1.08 per day)      | \$48.60        |
| Wages of horses (3 teams, \$1.50 per day)  | 4.50           |
| Food for men (45 men, \$0.50 per day)      | 22.50          |
| Food for horses (6 horses, \$1.00 per day) | 6.00           |
| 10 days                                    | <hr/> \$816.00 |

The costs of tar-paper, window glass, etc. would slightly increase this cost.

The cook house and men's camp is the largest building in camp. Its outside dimensions are 75 x 25 ft. The cookhouse is well lighted, by eight windows, ~~from~~ <sup>our</sup> in the roof and two on each side; the one large door opens into the "dingle" the space



such as possible by watermen with the aid of the crooked poles  
 the logs are piled with moss and clay; in the better cases  
 they are cemented. The roof is made of split logs and the  
 covered with bark.

Camp No. 1, of the G. N. P. Co., is a typical camp of this  
 region and is the one we selected for our study of camp ap-  
 ment and camp life. The following buildings, composed of  
 camp; cook-house and main camp, stable, blacksmith-shop, mill  
 room, office and storage shed.

The time required to build such a camp is from 10 days  
 from the time the first cut is made until the work is com-  
 pleted. The entire crew of 4 men and 2 teams of horses  
 are used in order to complete the work in this time. No account  
 is kept of the time per day and the cost is calculated on the  
 wages and food supplies of the men and horses. This total  
 amount to \$210.00.

|  |         |
|--|---------|
| Wages of men (4 men, \$1.00 per day)       | 4.00    |
| Wages of horses (2 horses, \$1.00 per day) | 4.00    |
| Food for men (4 men, \$2.00 per day)       | 20.00   |
| Food for horses (2 horses, \$1.00 per day) | 0.00    |
| <hr/> Total 10 days                        | \$28.00 |

The costs of tenting, with the men, etc., would be about  
 increase this cost.  
 The cook house and main camp is the largest building in  
 camp. Its outside dimensions are 12 x 12. The structure is  
 well lighted, by oil or kerosene, and the roof and the en-  
 ter side; the one large door opens into the "main hall" and the



between the men's camp and the cook house. The room is fitted with three long tables and benches sufficient to seat 60 men, two cookstoves, a long table on one side on which baking, etc. is done, and bunks for the cook and 2 "cookees". Food supplies not injured by freezing are kept in <sup>the "dingle"</sup> ~~this room~~, all other supplies are kept in the cook room. All the cooking and baking is done on the two large stoves of the wood burning type. Tin dishes are used entirely. A tin plate, drinking cup, knife and fork is kept for each man. All the necessary cooking utensils are found in the camp. The cook reigns supreme in the cook house. The men are not allowed to loiter in the cook room and are not permitted to carry on any conversation during meals. As soon as each man is thru eating he retires to the men's camp to smoke his pipe before starting to work. From fifteen to twenty minutes after the meal is announced nothing is left except dirty dishes. If the men are working at some distance from camp their luncheon is taken out to them by the cookees. During cold weather this is not very agreeable as the food freezes on one's plate; but such things are not noticed by woodsmen.

The men's camp also opens into the "dingle". The absence of furniture in this room is very conspicuous. For sleeping quarters two tiers of bunks are arranged on each side of the room. These are little more than stalls, large enough for two men. No bedding is supplied other than a woolen blanket for each man. To make it more comfortable, the men place fir boughs in the bottom of the bunks. Heat is supplied by a large stove in the center of the room, around which are a motley

between the men's camp and the cook house. The men's camp  
with three long tables and benches arranged to seat 30 men,  
two cookstoves, a long table on one side on which dishes  
is kept, and benches for the cook and 2 "helpers". Food supplies  
not injured by freezing are kept in this room, all other supplies  
are kept in the cook room. All the cooking and baking is done  
on the two large stoves of the wood burning type. Tin dishes  
are used entirely. A tin plate, drinking cup, knife and fork  
is kept for each man. All the necessary cooking materials are  
found in the camp. The cook and his helpers in the cook house.  
The men are not allowed to loiter in the cook room and are not  
permitted to carry on any conversations with the cook. As soon as  
each man is told that he is to eat he goes to the men's camp to  
his pipe before starting to work. From fifteen to twenty minutes  
after the meal is announced nothing is left to be dirty dishes.  
If the men are working at some distance from camp their lunch  
is taken out to them by the cook. During cold weather this  
is not very agreeable as the food freezes on the plate; but  
such things are not noticed by the men.

The men's camp also consists of the "dining". The space  
of furniture in this room is very considerable. For sleeping  
quarters two tiers of bunks are arranged on each side of the  
room. These are little more than stalls, large enough for two  
men. No bedding is supplied other than a woolen blanket for  
each man. To make it more comfortable, the men place fir  
boughs in the bottom of the bunks. Food is supplied by a large  
stove in the center of the room, around which are 4 benches

array of wet socks and moccasins. A bench in front of the tier of bunks runs the entire length of the room. It is from this bench that all the experiences of the day are recounted in the evening. In one corner of the room is a grindstone. Two windows in the roof furnish all the ventilation, as well as the light for this room. Sunday is wash day for the men. The water for washing purposes is heated in a large boiler on the stove. The clothes are hung out of doors to freeze dry.

No amusements are furnished the men; this is left entirely to their own liking. In a typical log camp the amusements consist of music, stories, and songs; but this was absent in this camp; probably due to the nationality of the men, who are Russian Jews, and are of a very quiet disposition.

Water for all purposes is obtained from a nearby brook. It is a duty of the cookee to supply the men and cook with this necessary article. Care is taken to keep this water supply from being contaminated, no refuse is allowed to be dumped above the source of the water supply.

The company places no regulations on the men with the exception that no liquor is allowed in camp. Aside from this the men are left to govern themselves.

The G. N. P. Co. makes no pretense whatever at giving the men any medical treatment, although linament is kept in the commissary, and is used for all complaints. The H. and W. Co. furnishes a set of "Johnsons' First Aid to the Injured" to each camp. All doctoring is done by the camp clerk, who set a broken leg so well that the doctor did not need to interfere with the work.



array of wet socks and stockings. A person in front of the line  
of barrels takes the entire length of the room. It is from this  
bench that all the experience of the day are recounted in the  
evening. In one corner of the room is a sink. Two windows  
in the roof furnish all the ventilation, as well as the light  
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to their own liking. In a typical lot camp the amusements  
consist of music, stories, and songs; but this was absent in  
this camp; probably due to the nationality of the men, who are  
Russian Jews, and not of a very quiet disposition.  
Water for all purposes is obtained from a hand pump. It  
is a duty of the cooks to supply the men and cook with this  
necessary article. Care is taken to keep this water supply  
from being contaminated, no refuse is allowed to be thrown  
above the source of the water supply.  
The company places no regulations on the men with the  
exception that no liquor is allowed in camp. Aside from this  
the men are left to govern themselves.  
The U. S. M. P. Co. makes no pretense whatever to control the  
men and medical treatment, although this is kept in the  
company, and is used for all complaints. The U. S. Co.  
furnishes a list of "Johnson's, First Aid to the Injured"  
each camp. All accounting is done by the camp clerk, who has  
a book in which all that the doctor did not want to interfere  
with the work



Wanigan supply for one year for four camps of 45 to 50 men each:

|                                    |            |
|------------------------------------|------------|
| Smoking tobacco (Peace & Goodwill) | 1040 lbs.  |
| " " (Cycle)                        | "          |
| Chewing tobacco (Spearhead)        | 718 "      |
| Stockings                          | 190 pair   |
| Mittens (woolen)                   | 90 "       |
| Low Moccasins                      | 78 "       |
| High "                             | 52 "       |
| Leather mittens                    | 76 "       |
| Leather gloves                     | 48 "       |
| Rubbers (one button)               | 50 "       |
| Undershirts.                       | 60         |
| Drawers                            | 60 pairs   |
| Top shirts (flannel \$1.50)        | 40         |
| Trowsers                           | 10 pair    |
| Mackinaw frocks                    | 6          |
| Overalls                           | 96 pair    |
| Caps                               | 30         |
| Leggins                            | 12 pair    |
| Johnson's Lineament                | 48 bottles |
| Pipes (corncob)                    | 90         |

The prices charged the men for these articles are not excessive, when one takes into account the increase in cost due to the cost of toting the supplies to the different camps and the risk taken owing to fire etc. A profit of about 20% is made on the articles sold.

Wanted to supply for one lot for the goods of 45 to 50

each:

|                                    |            |
|------------------------------------|------------|
| Smoking tobacco (Peace & Goodwill) | 1040 lbs.  |
| " " (Gyals)                        |            |
| Chewing tobacco (Spartan)          | 718 "      |
| Shirts                             | 120 pair   |
| Mittens (woolen)                   | 50 "       |
| Low neckerchiefs                   | 75 "       |
| " " " "                            | 52 "       |
| Leather mittens                    | 70 "       |
| Leather gloves                     | 40 "       |
| Rubbers (one pattern)              | 50 "       |
| Undergarments                      | 50         |
| Drawers                            | 50 pair    |
| Top shirts (flannel 1.00)          | 4          |
| Trowsers                           | 1 pair     |
| Blacking socks                     | 5          |
| Overalls                           | 50 pair    |
| Caps                               | 50         |
| Leggins                            | 12 pair    |
| Johnson's Liniment                 | 45 bottles |
| Files (oil cut)                    | 50         |

The price charged the men for these articles are not excessive, when one takes into account the increase in cost due to the cost of living and the supplies to the different camps and the risk taken owing to fire etc. A profit of about 20% is made on the articles sold.

The Company evidently thinks that it pays to feed their men well. A high quality of food is found on the table at meal time and none need to go away hungry,. Excellent cooks are employed and the food is served in good shape. The following is a list of supplies for a camp of 45 to 50 men for one week:

|                                |                     |
|--------------------------------|---------------------|
| Flour                          | 2 bbl.              |
| Lard                           | 50 lb.              |
| Beans (\$0.04 - .05 per lb.)   | 142.5 lb.           |
| Beef (fresh)                   | 250 "               |
| Pork (salt) (\$.29 per bbl)    | 62.5 "              |
| Molasses                       | 7.5 gal.            |
| Sugar                          | 90 lbs.             |
| Butterine (.20 per lb.)        | 22 "                |
| Tea (.16 per lb.)              | 6.25 "              |
| Soda                           | 2.75 "              |
| Cream of Tartar (.30 per lb.)  | 5 "                 |
| Rolled oats                    | 60 "                |
| Evaporated milk (Meadow Brand) | 18 cans             |
| Peas                           | $\frac{1}{2}$ bush. |
| Potatoes                       | $5\frac{1}{2}$ "    |
| Onions                         | 20 lbs.             |
| Turnips                        | 2 bu.               |
| Dried Apples                   | 12 lbs.             |
| Prunes                         | 12 "                |
| Raisons                        | $7\frac{1}{2}$ "    |
| Pickles (assorted)             | .25 bbl.            |
| Mackerel                       | .125 bbl.           |

The Company evidently thinks that it pays to feed men well. A high quality of food is found on the table at meal time and none need to go away hungry. Excellent cooks are employed and the food is served in good shape. The following is a list of supplies for a camp of 45 to 50 men for one week:

|                               |           |
|-------------------------------|-----------|
| Flour                         | 8 bbl.    |
| Lard                          | 50 lb.    |
| Beans (#0.04 - .05 per lb.)   | 145.5 lb. |
| Beef (frozen)                 | 250 "     |
| Pork (salt) (#29 per lb.)     | 65.5 "    |
| Molasses                      | 7.5 gal.  |
| Sugar                         | 50 lbs.   |
| Butterine (.20 per lb.)       | 52 "      |
| Tea (.10 per lb.)             | 6.25 "    |
| Soda                          | 4.75 "    |
| Green or Tartar (.30 per lb.) | 5 "       |
| Polled oats                   | 50 "      |
| Evaporated milk (condensed)   | 15 cans   |
| Potatoes                      | 1/2 bush. |
| Onions                        | 50 lbs.   |
| Turnips                       | 5 lbs.    |
| Dried Apples                  | 15 lbs.   |
| Prunes                        | 10 "      |
| Raisins                       | 1/2 "     |
| Pickles (assorted)            | 20 bbl.   |
| Ice-cream                     | 150 bbl.  |



|                            |         |
|----------------------------|---------|
| Pepper                     | .25 lb. |
| Ginger                     | .50 "   |
| Cloves                     | .125 "  |
| Nutmeg                     | .0625 " |
| Mustard (dry)              | .50 "   |
| Ham                        | 25 "    |
| Oil (kerosene) (in winter) | 5 gal.  |
| Salt (table)               | 5 lb.   |
| Cod fish                   | 25 "    |

The cost for feeding one man for one day is figured at \$0.50, this includes the wages of the cook and two cloaks and also includes the cost of freight and tiffin.

The camp clerk has full charge of the wangum and generally keeps all articles for sale in his office, which is the smallest building in camp. This building is occupied by the camp foreman, scaler and clerk. At camp No. 1. the scaler acted as clerk; he was kept very busy at night time keeping his accounts.

One building 25 x 25 feet in dimension served as blacksmith shop and saw filing room. The equipment for this building is that necessary for horseshoeing, sled building, general repair work and saw filing. There is one blacksmith and one saw filer for camp No. 1. and No. 2.

A saw to be filed is placed between two boards which are clamped together. These boards are fastened on a wooden horse by hinges. The tools used are: one flat file, one three cornered file, one tooth-guage, and one setting hammer.

|         |                            |
|---------|----------------------------|
| 23.10.  | Paper                      |
| " 30.   | Oil                        |
| " 123.  | Clives                     |
| " 2023. | Woman                      |
| " 3.    | Mustard (dry)              |
| " 2.    | Han                        |
| " 211.  | Oil (Kerosene) (in winter) |
| " 11.   | 2.11 (Lamp)                |
| " 30.   | God fish                   |

The cost for the building was for one year is 11 and 11

10.00, this includes the wages of all the men and women

and the cost of the building materials.

The camp at No. 1 full charge of the woman and generally keeps all articles for sale in his office, which is the smallest building in camp. This building is occupied by the camp foreman, scaler and clerk. At camp No. 1, the scaler acted as clerk; he was kept very busy at night time keeping his accounts.

One building 25 x 25 feet in dimension served as blacksmith

shop and saw firing room. The equipment for this building is that necessary for horse shoeing, sled building, general repair work and saw firing. There is one blacksmith and one saw fitter for camp No. 1 and No. 2.

A saw to be filed is placed between two boards which are clamped together. These boards are fastened on a wooden horse by hinges. The tools used are: one flat file, one three cornered file, one tooth-hinge, and one setting hammer.

It takes from 15 - 30 minutes to file one saw; the time depending on the condition of the saw. The filer has from 3 to 5 saws to file each day. The filer has the easiest job in the camp and spends most of his time smoking his pipe. The number<sup>of</sup> times a saw is filed when in continuous use depends on the care given it by the sawyers and the kind of country in which they are working.

The stable is a large building 40 x 30 feet, capable of housing 12 horses. A feed room runs the entire length of the building and the stalls are arranged on either side of the entry. On each side of the stable is a manure yard; in these hogs are kept and are fed the waste of the camp. There is no place in the stable to keep the feed; but this is stored in a shed opposite this building. The horses are watered from buckets along the brook; a water hole must be cut thru the ice several times a day. Hay and oats form the staple articles of food for the horses. Each horse is fed per day 37.5 lbs. of hay, 15 qts. of oats when yarding and 18 qts. when wagon sledding. The cost of feed per horse per day is figured at \$1.00 - \$1.20. H. & W. Co. employ a stable man to feed and tend the horses. They consider this a means of saving the feed and bettering the condition of the horses, for many of the teamsters have but a faint idea of the amount of feed necessary for good work. Straw is used for bedding the horses and one fourth of a car per year is consumed by one camp.

Heavy draft horses, weighing from 1200 - 1400 lbs., are used on all the operations. The cost of these range from \$400 - \$600



It takes from 15 - 30 minutes to fill one saw; the time depending on the condition of the saw. The flier has from 5 to 8 saws to file each day. The flier has the easiest job in the camp and spends most of his time smoking his pipe. The number of times a saw is filed when in continuous use depends on the care given it by the sawyers and the kind of country in which they are working.

The stable is a large building 40 x 50 feet, capable of housing 18 horses. A feed room runs the entire length of the building and the stalls are arranged on either side of the entry. On each side of the stable is a manure yard; in these manure are kept and are fed the waste of the camp. There is no place in the stable to keep the feed; but this is stored in a shed opposite this building. The horses are watered from buckets along the track; a water cistern must be cut into the side of the hill and cists from the stable entrance of feed for the horses. Each horse is fed per day 25 lbs. of hay, 15 lbs. of oats when varying and 10 lbs. when ration of grain. The cost of feed per horse per day is figured at \$1.00 - \$1.20. H. & W. Co. employ a stable hand and feed the horses. They consider this a means of saving the feed and keeping the condition of the horses, for many of the feedmasters have put a faint idea of the amount of feed necessary for good work. Straw is used for bedding the horses and one fourth of a ton per year is consumed by one camp.

Heavy draft horses, weighing from 1200 - 1500 lbs., are used on all the operations. The cost of these ranges from \$400 - \$600



per team. There is a team for each cutting crew besides the one used for toting. At camp No. 1. there were 42 men in the woods and 5 teams.

Late in the summer a crew of men begin to build the tote road previously laid out and marked by the foreman. It is very important that this road is as level and well built as possible. Although all up hill pitches are undesirable little or no grading is done with the exception of removing rock and boulders. All swampy places are cord<sup>u</sup>royed and bridges are built wherever necessary. The bridges consist simply of log stringers across which poles are laid.

All the supplies are toted into the woods from Holeb. At this <sup>place</sup> siding and permanent warehouses are owned by H. & W. Co. and G. N. P. Co. Supplies are stored in these warehouses previous to, toting into the company's camps. Each tote team carries one ton per load and makes two trips daily to either camp No. 1. or No. 2, a distance of five miles. On the ~~re~~turn trip the manure is taken from the camp stable to the company farm at Holeb. For a distance of 11 miles toting costs \$4 per ton in winter and \$1.2 in summer. Due to the expense of toting in the summer most of the supplies are hauled in during the previous winter. H. & W. at camp No. 6. have a very substantial warehouse for storing supplies. This building is 30 x 80 feet and has an oats bin capable of holding 3 cars of oats, of 1500 bu. each; 60 tons of hay and sufficient supplies until sledding is possible. This requires the service of a man all summer to act as watchman.

form. There is a small cabin, one building and one  
ed for totting. At camp No. 1, there were 40 men in the woods  
and 5 teams.

Late in the summer, a crew of men began to build the log  
road previously laid out and marked by the foreman. It is very  
important that this road be as level as possible and well built as possible.  
Although all up hill grades are unavoidable, little or no  
grading is done with the exception of moving rock and boulders.  
All swampy places are cordoned off and are left where they  
are. The bridges consist simply of log stringers across  
which poles are laid.

All the supplies are moved into the woods from camp. At  
this <sup>place</sup> siding, the permanent warehouses are owned by W. G. Co.  
and G. W. P. Co. Supplies are stored in these warehouses previous  
to totting into the company's camp. Each totter has a horse and  
team for load and makes two trips daily to either camp No. 1 or  
No. 2. A distance of five miles. On the Indian trail, a horse  
is kept from the camp stable to the company farm at camp No. 1.  
A distance of 11 miles totting costs \$4 per ton in winter and \$3  
in summer. Due to the expense of totting in the summer, most of  
the supplies are hauled in during the previous winter. W. G. Co.  
at camp No. 2 have a very good trail warehouse for totting  
supplies. This building is 40 x 60 feet and has a large  
capable of holding 500 tons of supplies. It has a door 30 feet  
of hay and which is supplied with electricity as possible. This  
building is a service of all supplies and is well equipped.

Supplies and tools that are furnished four camps for one year:

|   |          |
|---|----------|
| Axes (single bitted Simon)                | 25 doz.  |
| Axes (double bitted)                      | 4 "      |
| Cant dogs (complete)                      | 125      |
| Cant dogs (stock)                         | 150      |
| Cant dogs (bolts)                         | 300      |
| Cant dogs (hooks)                         | 72       |
| Saws (Simon) (used 40 and return 5)       | 45       |
| Tree wedges (iron)                        | 45       |
| Grindstones                               | 4        |
| Flat files (simon)                        | 18 doz.  |
| Horse shoes (assorted)                    | 900      |
| Horse shoe nails                          | 135 lbs. |
| Trace chain (one fourth inch)             | 200 ft.  |
| Chain (three eighth inch for wagon sleds) | 500 ft.  |
| Blankets                                  | 190      |
| Lanterns                                  | 48       |
| Lamps                                     | 48       |
| Lamp globes                               | 132      |
| Lantern globes                            | 96       |
| Grain bags                                | 200      |
| Breakage, to tools per man per day        | \$0.10   |

All sleds are made in the woods by the blacksmith. Yellow birch is used entirely for the woodwork. The entire cost of these wagon sleds for a 4 horse team is \$90 - \$100; for a two horse team \$65 - \$75.

horse team \$5 - 15.

these wagon shafts for a horse team 1.90 - 2.10; for two  
hitch is used entirely for a woodwork. The entire cost of  
All shafts are made in the woods by the blacksmith. Yellow

Breakage, to tools per man per day .10

Grain bags 200

Lantern globes 95

Lamp globes 125

Lamps 48

Lanterns 45

Blankets 150

Chain (three eighth inch for wagon shafts) 100 ft.

Trace chain (one fourth inch) 200 ft.

Horse shoe nails 135 lbs.

Horse shoes (assorted) 900

Flat files (diamond) 18 doz.

Grindstones 4

Tree wedges (iron) 45

Saws (diamond) (used and returned) 45

Giant hoes (hooks) 75

Giant logs (poles) 300

Giant dogs (stock) 130

Giant dogs (complete) 125

Axes (double bit) 4

Axes (single bit) 25 doz.

Year:

Supplies and tools that are furnished from camp for one



Some of the large concerns think they can get better service by having telephone connections with the different camps. H. & W. have installed a two wire system between their operations. The wires of this system were allowed to lie on the ground, only at crossings were they strung overhead. In the winter these wires are fully protected from injury. This line is  $14\frac{1}{2}$  miles long and the cost of the labor to build it amounted to \$52.70 without the clerk's wages, who had charge of the work.

This company also placed fire extinguishers in all their camp buildings. Where not liable to freeze, as in the cook room, wet ones are used, while dry ones are used in other places.

H. & W. and G. N. P. Co. determined not to pay more than \$28 and keep per man, while the jobbers pay \$30 - \$35 and keep per man. On this account and due to the dead and fallen timber where no skill is necessary in felling trees only the poorer class of laborers were secured thru an employment agency at Boston. These men are known as "Boston Tigers" and are often secured under false pretense, many of them are hired to teach school.

#### WOODS OPERATION.

The trees are first undercut, 3- 4 inches with an ax and are then felled with a saw. Where it is not possible to use a saw they are cut entirely with an ax. In felling the trees no care is taken of the young growth. Trees are always felled so that they can be skidded out with the least amount of swamping, this was generally parallel to the road.

Some of the large concerns think they can get better service by having telephone connections with the different camps. H. W. have installed a two wire system between their operations. The wires of this system were allowed to lie on the ground, only at crossings were they strung overhead. In the winter these wires are fully protected from injury. This line is 14 1/2 miles long and the cost of the labor to build it amounted to \$3,000.00 without the clerk's wages, who had charge of the work.

This company also placed five extinguishers in all their camp buildings. Where not liable to freeze, as in the cook room, wet ones are used, while dry ones are used in other places. H. W. and G. W. Co. determined not to pay more than \$28 and keep per man, while the jobbers pay \$50 - \$60 and keep per man. On this account and due to the dead and fallen timber where no skill is necessary in falling trees only the poorer class of laborers were secured thru an employment agency at Boston. These men are known as "Boston Tigers" and are often secured under false pretense, many of them are hired to teach school.

#### WOODS OPERATION.

The trees are first undercut, 3-4 inches with an ax and are then felled with a saw. Where it is not possible to use a saw they are cut entirely with an ax. In felling the trees no care is taken of the young growth. Trees are always felled so that they can be skidded out with the least amount of swamping, this was generally parallel to the road.

The tops of the trees were cut to a four inch diameter and no attempt was made for their disposal, neither were the branches disposed of; but left lying as they were lopped off the trees. The logs were not cut into any standard length. Large trees were cut in two, otherwise the tree was left intact. The G. N. P. Co. aimed to keep their stumps as low as possible. In the cutting rules issued by this Co. the provision is made (to cut all trees at the point where the bulge of the roots meets the trunk, unless prevented by the roughness of the country).

A cutting crew is composed of two men: each man takes his turn in making the undercut. Then they both use the saw, and after the tree is felled, both men lop off the branches and cut out the tops. If necessary the tree is sawed into two logs. If the tree is found defective at either end the affected part is cut off. In case a tree has to be chopped down a man works on each side. Each crew is supplied with: two axes, (single bitted) one cross-cut saw, one iron wedge, one sledge, and one cant dog. These crews average 5000 bd. ft. per day in green timber. It costs \$.70 per M. for cutting.

|               |                |         |         |
|---------------|----------------|---------|---------|
| Wages 2 men   | \$1.08 per day | 6 days  | \$12.96 |
| Food "        | \$.50          | " " 7 " | 7.00    |
| Wear & tear " | \$.10          | " " 6 " | 1.20    |
|               |                |         | -----   |
| 30 M.         |                |         | \$21.16 |
|               |                |         | -----   |
| Cutting       |                |         | \$00.70 |

A crew of two men is employed for swamping for each cutting crew. It is their duty to swamp out roads so that all logs can



The tops of the trees are cut off and the branches are disposed of, but left lying as they were lopped off the trees. The logs were not cut into any standard length. Large trees were cut in two, otherwise the tree was left intact. The G. M. P. Co. aimed to keep their stumps as low as possible. In the cutting rules issued by this Co. the provision is made (to cut all trees at the point where the bulk of the roots meets the trunk, unless prevented by the roughness of the country).

A cutting crew is composed of two men: each man takes his turn in making the undercut, then they both use the saw, and after the tree is felled, both men lop off the branches and cut out the tops. If necessary the tree is thrown into two or three parts. If a tree is found defective at either end the affected part is cut off. In case a tree has to be chopped down a man works on each side. Each crew is supplied with: two axes, (single bladed) one cross-cut saw, one iron wedge, one sledge, and one cant bar. These crews average 3000 ft. per day in green timber. It costs \$.70 per M. for cutting.

|                                   |         |
|-----------------------------------|---------|
| Wages 2 men @ 1.08 per day 6 days | \$12.96 |
| Wood " " " " " "                  | 7.00    |
| Wear & tear " " " " " "           | 1.80    |
| <hr/>                             |         |
| G. M. P. Co.                      | \$21.76 |
| <hr/>                             |         |
| Cutting                           | \$20.70 |

A crew of two men is employed for sawing for each cutting crew. It is their duty to keep the logs in such a way that all logs can



easily be reached by the skidding team. The equipment used by the crews are; two axes, one cross-cut saw, and one cant dog. The costs for swamping are the same as those for cutting as they follow up the cutters.

The logs are skidded to the yard with a single sled and a team of horses. The one end is chained on the sled and the other end is left to drag on the snow. This is called "tail dragging". From 200 - 500 bd. ft. is skidded at one time. A skidding crew consists of two men; a teamster and sled tender. One team, single sled, two cant dogs, one ax, and binding chain is the equipment used. A skidding crew of this kind is assigned to each cutting crew.

#### COST.

|  |                      |
|--|----------------------|
| Wages 2 men \$1.08 per day 6 days      | \$12.96              |
| Food 2 men \$.50 per day 7 days        | 7.00                 |
| Wages 1 team \$1.50 per day 6 days     | 9.00                 |
| Horse feed \$2.20 per day 7 days       | 15.40                |
| Wear & tear 2 men \$.10 per day 6 days | 1.20                 |
| 30 M.                                  | <u>\$45.56</u>       |
| skidding                               | <u>\$1.50 per M.</u> |

The skidway or yard is located with reference to the cutting operation. It is the aim to have the yards near the place of cutting so that long hauls can be avoided. The yard is built at the base of a slope so that the logs can be easily piled without rolling them up skids, and yet have a suitable place for loading on wagon sleds from the lower end of the yard.

usually be reached by the skidding team. The equipment used by the  
crews are; two axes, one cross-cut saw, and one cant dog. The  
costs for sweeping or the same as those for cutting as they  
follow up the cutters.

The logs are skidded to the yard with a single sled and  
team of horses. The one end is chained on the sled and the  
other end is left to drag on the snow. This is called "tail  
dragging". From 200 - 300 sq. ft. is skidded at one time. A  
skidding crew consists of two men; a teamster and sled tender.  
One team, single sled, two cant dogs, one ax, and binding chain  
is the equipment used. A skidding crew of this kind is sent out  
to each cutting crew.

COST.

|   |       |
|---|-------|
| Wages 2 men \$1.00 per day 5 days           | 5.00  |
| Food 2 men $\frac{1}{2}$ .50 per day 5 days | 2.50  |
| Wages 1 team \$1.00 per day 5 days          | 5.00  |
| Horse feed \$2.20 per day 5 days            | 11.00 |
| Wear & tear 2 men .10 per day 5 days        | 1.00  |
|   | <hr/> |
|   | 44.50 |
| Skidding 1.50 per sq. ft.                   |       |

The skidway or yard is located with reference to the  
cutting operation. It is the aim to have the yard near the  
place of cutting so that long hauls can be avoided. The yard is  
built at the base of a slope so that the logs can be easily  
piled without rolling them up hills, and yet have a suitable  
place for loading or unloading from the lower end of the yard.

The first logs heuled into the yard are used for the crib work upon which the rest of the logs are piled. The logs composing the crib work are notched at the ends and laid much like that in building a log cabin. The height of the lower end of the yard is about 1 ft. higher than the wagon sleds. The top tier of the cribbing furnish the skids upon which the logs are rolled out on the yard. All logs, used in constructing the crib work or yard, are scaled and hauled to the landing after the other logs are removed. A yarding crew is composed of two men, supplied with two cant dogs and two marking axes. On the butt and top of each log the initials G. N. are stamped, in addition to this the following log marks are cut near each end,  $H\updownarrow$ . The ( $H$ ) stands for the township in which the log is cut, as Holeb, and the ( $\updownarrow$ ) is the Co.'s log mark. At one of the "jobber's" camps in Forsythe Township the following marks are used:  $\updownarrow YX$  fir and spruce;  $\updownarrow MIX$  pine and cedar.

Cost for yarding:

|  |                       |
|--|-----------------------|
| Wages 2 men \$1.08 for 6 days            | \$12.90               |
| Food 2 men \$0. <del>50</del> for 7 days | 7.00                  |
| Wear & tear 2 men \$0.10 for 6 days      | 1.20                  |
| 90 M.                                    | <u>\$21.10</u>        |
| Yarding                                  | <u>\$00.23 per M.</u> |

ICE ROADS.

The roads from the yard to the landings are the best on the operation. They aim to have it all down grade. For ice roads a 1% grade is desirable, while grades as steep as 5 - 6% can

The first log is rolled into the yard and used for the ship work upon which the rest of the logs are piled. The logs are piled in the crib work are notched at the ends and laid across the front in building a log cabin. The height of the lower end of the yard is about 1 ft. higher than the wagon slides. The top tier of the cribbing furnish the skids upon which the logs are rolled out on the yard. All logs, used in constructing the crib work on yard, are sealed and nailed to the landing after the other logs are removed. A yarding crew is composed of two men, supplied with two cant dogs and two marking axes. On the out and top of each log the initials J. W. are stamped. In addition to this the following log marks are cut near each end,

H & T. The (H) stands for the township in which the log is cut, as Holen, and the (T) is the Co.'s log mark. As one of the "jobber's" camps in Forsythe Township the following marks are used: X & Y fir and spruce; J & W pine and cedar.

#### Cost for yarding:

|                               |         |
|-------------------------------|---------|
| Wages 2 men \$1.08 for 8 days | \$12.50 |
| Food 2 men \$0.30 for 7 days  | 7.00    |
| Wages 2 men \$0.10 for 8 days | 1.30    |
|                               | <hr/>   |
|                               | \$21.10 |
| Yarding \$0.10 per ft.        | <hr/>   |

#### ICE ROADS.

The roads from the yard to the landing are the best of the operation. They aim to have at all times. For ice roads a 1% grade is desirable, while grades as steep as 5% can



be used on snow roads. On all grades of 8% and over on snow roads snubbing is necessary.

The road is marked out by the camp foreman, who uses his eyesight and judgment in doing his work. A road making crew is then put on to remove stumps, rock and boulders and put the road in as smooth a condition as possible without doing any grading. Bridges are built wherever necessary, boggy places are corduroyed and skids are used to keep sleds from going over sloping banks. This road must be about 14 ft. wide on account of the width of the wagon sleds.

As soon as the snow has reached a depth of 10 - 12 inches, they begin to break the road. First the empty sleds are run thru, then a brush or chain drag is hauled over the road. This is done for each succeeding snow fall until a good foundation is secured. A sled is then run over the roads to cut deep runs the width of the wagon sleds. Every night from this time on the sprinkler is hauled over the road. This consists of a wooden tank on a sled. Water is applied to each rut from openings in the rear end of the tank. By this method a good ice surface is furnished the runners while the horses get a good footing in the packed snow.

Two methods are used for slackening speed of sleds down steep grades. On the steepest grades a snubbing line  $1\frac{1}{2}$  inch hemp rope placed around two stumps as shown in the accompanying diagram is used.

"Bridling" is practiced on more moderate grades. This is a

be used on snow roads. On all grades of 5% and over on snow

roads snubbing is necessary.

The road is marked out by the camp foreman, who uses his

eyesight and judgment in doing his work. A road marking crew

is then put on to remove stumps, rock and boulders and put the

road in as smooth a condition as possible without doing any

grading. Bridges are built wherever necessary, by putting planks on

corduroys and skins are used to keep slides from coming over

sloping banks. This road must be about 14 ft. wide on ascending

of the width of the wagon slides.

As soon as the snow has reached a depth of 10 - 12 inches,

they begin to break the road. First the empty slide is run

thru, then a brush or chain drag is hauled over the road. This

is done for each section until a good foundation

is secured. A sled is then run over the road to cut deep tracks

the width of the wagon slides. Every 10 ft. from this line on the

sprinkler is hauled over the road. This consists of a wooden

tank on a sled. Water is applied to each rut from openings in

the rear end of the tank. By this method a good ice surface is

furnished to runners while the horses get a good footing in

the packed snow.

Two methods are used for clearing snow from slides down

steep grades. On the steepest grades a snubbing line is run

and rope placed around two stumps is shown in the accompanying

illustration is used.

"Snubbing" is practiced on more moderate grades. This is a

simple method of creating friction by wrapping a chain around one of the front runners of the sled. It is a rather dangerous practice for the chain is liable to break on roots and stones. In this case a driver is left to his own resources.

On short steep grades hay is scattered over the road as a means of slackening speed.

From 2000 - 3000 bd. ft. is the average load hauled on the wagon sleds, the biggest load was 5000 bd. ft. The teams are able to make 6 - 7 trips daily, from the yard to the landing a distance of about  $\frac{1}{2}$  mile. The road however is very steep and snubbing is necessary at two places. On good roads horses are able to go about 18 miles per day without over exertion.

Costs for  $\frac{1}{2}$  mile haul described above:

|  |                |
|--|----------------|
| Wages, 4 men, \$1.08 _ 6 days                    | \$25.92        |
| Food, 4 men, \$ .50 - 7 days                     | 14.00          |
| Wages, 1 team, \$1.50 - 6 days                   | 9.00           |
| Feed, 1 team, \$2.20 - 7 days                    | 15. 40         |
| Wear and tear 4 men \$ <sup>#</sup> .10 - 6 days | 2.40           |
| 97.5 M.  | <u>\$66.72</u> |

Cost of hauling to landing \$60.68 per M.

Within the last few years steam log haulers have been introduced in the Maine woods for hauling from yard to landing. Great care in the construction of roads for steam log haulers is necessary. The roads must be at least 20 ft. wide and must have a smoother surface than is necessary for wagon sledding. A large force of men is kept working on the road continually



simple method of increasing friction by wrapping a chain around one of the front runners of the sled. It is a rather dangerous practice for the chain is liable to break or roots and stones. In this case a driver is left to his own resources. On short steep grades hay is scattered over the road as a means of slackening speed.

From 2000 - 3000 ft. is the average load hauled on the wagon sleds, the lightest load was 2000 lb. ft. The teams are able to make 8 - 10 trips daily, from the yard to the landing a distance of about 1/2 mile. The road however is very steep and climbing is necessary at two places. On good roads it takes sleds to go about 18 miles per day without over exertion.

Costs for 1/2 mile haul as follows:

|                                      |          |
|--------------------------------------|----------|
| Wages, 4 men, \$1.00 - 5 days        | \$50.00  |
| Food, 4 men, \$.50 - 5 days          | 25.00    |
| Wages, 1 team, \$1.50 - 5 days       | 75.00    |
| Feed, 1 team, \$2.50 - 5 days        | 125.00   |
| Wear and tear, 4 men, \$.10 - 5 days | 5.00     |
|                                      | <hr/>    |
|                                      | \$275.00 |

Cost of hauling to landing \$100.00 per ton.

Within the last few years steam log haulers have been introduced in the Maine woods for hauling from yard to landing. Great care in the construction of roads for steam log haulers is necessary. The roads must be at least 30 ft. wide and must have a smoother surface than is necessary for horse sledging. A large force of men is kept working on the road continually.



during the hauling season. An idea of the log hauler may be gained from the illustration.

The sleds used for these haulers are (A full set of these sleds cost \$300) specially designed. It is possible to haul four of these sleds, loaded, when the roads are in good condition. About 20,000 - 25,000 bd. ft. constitutes a load., and two trips are made over a distance of 6 - 9 miles per day. At the beginning of the hauling season the cost of hauling over this distance was \$7.25 per M. In January this was reduced to \$3.50 per M. and they expected to reduce it to \$3.00 per M. before the season is over.

The shipping weight of the log hauler is 17 tons and has a 100 H. P. engine. It cost \$5000. In order to make the machine pay for itself a charge of \$0.75 per M. is made against all logs hauled. In this way they figure the full cost and repairs will be paid for in three years. Expenses connected with the log hauler are accurately kept, even the cord wood burned is charged up against it.

Information concerning the log hauler was obtained from H. & W. Co. at Holey Maine.

The G. N. P. Co. are not favorable toward log haulers.

#### BRIVING STREAMS.

All the lakes, ponds, and rivers of this region drain into the Kennebec River. The logs are hauled on the lakes in the winter. In the spring they are boomed out of the lakes or are carried out by favorable winds. Booming costs \$0.15 - \$0.20

during the logging season. An idea of the log handler's pay is

gained from the illustration.

The sleds used for these hauls are (A full set of sleds

sleds cost \$300) specially designed. It is possible to haul

four of these sleds, loaded, when the roads are in good con-

dition. About 20,000 - 25,000 lbs. constitute a load, and

two trips are made over a distance of 5 - 8 miles per day. At

the beginning of the logging season the cost of hauling over

this distance was \$4.25 per M. In January this was reduced to

\$3.50 per M. and they expected to reduce it to \$3.00 per M.

before the season is over.

The shipping weight of the log handler is 15 tons and cost

a 100 h. P. engine. It cost \$2000. In order to make the hauling

pay for itself a contract of \$1.75 per M. is made against the

hauler. In this way they figure the full cost and repairs will

be paid for in three years. Expenses connected with the log

handler are accurately kept, even the cord used burned is charged

up against it.

Information concerning the log handler was obtained from W.

& W. Co. at Hopedale.

The G. N. P. Co. are not favorable toward log hauling.

### DRIVING STREAMS.

All the lakes, ponds, and rivers of this region drain into

the Kennebec River. The logs are hauled on the lakes in the

winter. In the spring they are boomed out of the lakes or

are carried out by favorable winds. Booming costs \$0.15 - \$0.20

per M. From Holeb Pond to Moosehead Lake it costs \$1.00 per M. to drive the logs, as near as we could determine. On Moosehead Lake the logs are formed in rafts and towed across to the outlet; from this point they are driven down the Kennebec River to Madison. Driving from Moosehead Lake to Madison costs \$1.00 per M. At Madison the logs are sorted and piled on the shore by means of an overhead cable.

This operation costs \$0.50 per M.

#### Driving:

|                                      |         |
|--------------------------------------|---------|
| Holeb to Moosehead Lake per M.       | \$1.00  |
| Moosehead Lake to Madison per M.     | 1.00    |
| Booming per M.                       | .20     |
| Towing across Moosehead Lake per M.  | .25 (?) |
| Sorting and Piling at Madison per M. | .50     |

\$2.95 per M.

Due to the season of the year that this trip was taken, actual observation of a "drive" was not possible; but the data was secured from men who had experience along this line.

#### SCALING.

Scaling is done as the logs are brought into the yard. To make sure that all the logs are hauled from the yard they are rescaled and checked at the landing. The equipment used by the scaler is the Holland Log rule, with or without a wheel for measuring length of logs, marking pencil, and tally sheet.

"The Maine rule, also called Holland and Fabian's Rule is used exclusively. Its use is restricted to northern New England,



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|               |                                      |
|---------------|--------------------------------------|
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| 1.00          | Moosehead Lake to Madison per M.     |
| .20           | Booming per M.                       |
| .25 (?)       | Towing across Moosehead Lake per M.  |
| .30           | Sorting and Piling at Madison per M. |
| <hr/>         |                                      |
| \$2.95 per M. |                                      |

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and chiefly to Maine, where it has long been the principal log scale.

The Maine rule was prepared from diagrams representing the small ends of logs of all diameters from 6 - 48 inches. The inscribed square of the logs was first determined, and the contents of the logs were then computed by allowing one inch for each board and one-fourth of an inch between the boards for saw kerf. The boards outside the square were reckoned, if not less than 6 inches in width; otherwise the whole slab was discarded. In practice logs over 32 ft. long are reckoned as two logs, the scaler measuring the diameter of the uppermost at the small end, and estimating the diameter of the small end of the lower log". Taken from "The Woodsman Handbook", Part 1 by H. S. Graves,. To this may be added that small logs fall short of the scale and large logs go over the scale.

The scaler uses his own judgement in discounting defects as crooks, rot etc. One of his duties is to examine every stump, and where it is found higher than the bulge of the root, he scales the amount of lumber in the stump and reports it each week to the head scaler at Greenville. Then the company can deduct this amount from the jobber if it sees fit to do so.

A scaler can handle from 15000 - 20000 bd. ft. per day, at a cost of \$0.13 per M.

Weekly and monthly reports are sent to the main office by the head clerk in the woods. These reports cover, shipments received, provisions and supplies consumed, number of men and

and chiefly to Maine, where it was long been the principal log scale.

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The scaler uses his own judgment in discounting defects as crooks, rot etc. One of his duties is to examine every stump, and where it is found that more than the half of the stump he scales the amount of lumber in the stump and reports it each week to the head scaler at Greenville. Then the company can deduct this amount from the lumber if it does fit to do so. A scaler can handle from 1500 - 2000 cu. ft. per day, at a cost of "0.13 per cu. ft."

Weekly and monthly reports are sent to the main office of the head clerk in the woods. These reports cover, shipments received, provisions and supplies consumed, number of men and

horses on the operation and their wages, accidents and number of meals served per week for men and horses. The camp clerks send their reports to the head clerk from which the above reports are made out. At the end of the season an inventory is taken of all supplies on hand and everything must be accounted for, as consumed, broken or on hand.

At the end of each week the scaler sends a report of the amount scaled for each species to the woods office at Greenville.

An idea of the amount of work necessary in making out these reports can be obtained from the blanks and forms used by the G. M. P. Co. and H. and W. Co. which accompany this report.

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## MANUFACTURING PLANTS.

After completing the woods operation, the Pulp Mills at Madison were visited. At this town H. & W. have just completed their plant for the manufacture of wood pulp by the Mechanical Process. In the spring after the "drive" is completed and the logs sorted, they are piled on the shores of the river by means of an overhead cable. As they are needed they are pulled back into the river by the same means. This is done to prevent the logs from being frozen in the ice. From the point where they are taken into the river, they are floated thru a channel cut in the ice, to the log "jack". Men with "pike poles" keep the logs in motion along this channel. The logs are taken into the mill by an endless chain "log jack". A man stationed inside of the mill, takes the scale of the logs as they come into the mill, he also runs the "log jack" and "flippers". The log deck slopes toward a set of live rolls which carries the logs to a large drag saw. This saw cuts them into 8 foot lengths. From this saw they are carried up an incline and sawed thru the middle, further up this incline, they are again sawed into 2 foot lengths. The two foot lengths are then dumped into a belt conveyor and carried to the barking machines. These machines remove the bark and a thin layer of wood. Conveyors carry these barked pieces to the floor below. Here they are ground up by being forced against large grindstones. A continuous flow of water passes over these grindstones and washes the ground mass to a screen, which removes all the coarse material. This screened fiber is conveyed upstairs

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to a large tank, previous to passing thru a series of screens, each one several inches lower than the one preceeding. From these screens this semi-liquid passes to the pulp machines and comes out in the form of large sheets. These sheets are folded, loaded on trucks and weighed before being loaded into cars and carried to Waterville where it is made into paper.

32% of the weight of the pulp as it comes from the rolls is wood fiber, the other 68% is water.

#### G. N. P. Co. MILLS AT MADISON, MAINE.

The logs as piled in the yard are in four foot lengths. Conveyors carry these into the mill and are cut into two foot lengths. These pieces are conveyed up stairs to a long trough filled with hot water. Machines for chipping off the bark are located along this trough and the men pick the pieces out of the trough as needed. These cleaned bolts are then conveyed to a machine where they are cut into small chips. All this chipped material is carried to a revolving cylindrical screen, set at an angle of 15 degrees. By means of different size mesh in the screen, the material was separated into saw-dust, chips, and coarser material. The different sized chips were conveyed to bins situated above the treating tanks. The large horizontal cylindrical treating tanks are filled with these chips and steam is applied for two hours. The calcium sulphate is then forced in and cooked for 22 - 30 hours. The acid is then pumped out and the material washed for several hours. This mass is then dropped to concrete lined reservoirs from where it is



to a large tank, previous to passing thru a series of screens, from each one several inches lower than the one preceding. From these screens this semi-liquid passes to the pulp machines and comes out in the form of large sheets. These are then folded, loaded on trucks and weighed before being loaded into cars and carried to Waterville where it is made into paper.

32% of the weight of the pulp as it comes from the rolls is wood fiber, the other 68% is water.

G. M. P. CO. MILLS AT MADISON, MAINE.

The logs as piled in the yard are in four foot lengths. Conveyors carry these into the mill and are cut into two foot lengths. These pieces are conveyed up stairs to a long trough full of white hot water. Machines for stripping off the bark are located along this trough and the men pick the pieces out of the trough as needed. These cleaned pieces are then conveyed to a machine where they are cut into small chips. All this chip material is carried to a revolving cylindrical screen, set at an angle of 15 degrees. By means of different sized screens the material is separated into saw-dust, chips, and coarser material. The different sized chips were conveyed to bins situated above the pressing tanks. The large chips are cylindrical pressing tanks are filled with these chips and steam is applied for the reason. The vertical cylinder is then forced in and cooked for 24 - 30 hours. The pulp is then pumped out and the material washed for several hours. This mass is then dropped to concrete lined reservoirs from where it is



carried to a series of screens. It then passes from here to the pulp machines. The pulp as it is needed is carried on trucks to where it is worked into a semi-liquid mass. It then passes thru a series of screens and troughs to the rolls and blankets of the paper machines where it is rolled out into thin sheets and dried over a series of hot rolls. As it comes from the paper machines it is reeled on a roll 8 feet long. This roll is run on to another reel and the paper is cut into the desired width as it is wound up. The rolls of paper are then taken to the warerooms and prepared for shipment.

#### CEDAR SHINGLE MILL AT OAKLAND, MAINE.

The mill is one of the old type shingle mills and is run on a very small scale. The logs are cut into sixteen inch lengths by a circular drag saw outside the mill. The bolts are placed upright on a carriage which moves foreward and backward. On each forward motion a shingle is cut off by a large circular saw. The man who tends this machine also edges the shingles on a machine fitted with revolving cutting blades, and throws them into two different bins according to grade. Two men bundle the shingles.

#### SHOVEL HANDLE FACTORY AT OAKLAND MAINE.

The handles are hewn out roughly by hand, and cut to proper length for turning (Fig.1). The shaft is rounded in a lathe, the cutting knives being worked by a lever (Fig.2). An inch and a half hole is bored thru the center of the handle and the lower part of the hand hold is shaped (Fig. 3). The handle

carried to a series of screens. If they pass through to the pulp machines. The pulp as it is needed is carried on trucks to where it is worked into a semi-liquid mass. It then passes thru a series of screens and troughs to the rolls and planks of the paper machines where it is rolled out into thin sheets and dried over a series of hot rolls. As it comes from the paper machines it is reeled on a roll 8 feet long. This roll is run on to another reel and the paper is cut into the desired width as it is wound up. The rolls of paper are then taken to the warehouses and prepared for shipment.

#### CEDAR SHINGLE MILL AT OAKLAND, MAINE.

The mill is one of the old type shingle mills and is run on a very small scale. The logs are cut into six or seven lengths by a circular drag saw outside the mill. The bolts are placed upright on a carriage which moves forward and backward. On each forward motion a shingle is cut off by a large circular saw. The man who turns this machine also guides the shingles on a machine fitted with revolving cutting blades, and throws them into two different bins according to grade. Two men handle the shingles.

#### SHOVEL HANDLE FACTORY AT OAKLAND MAINE.

The handles - for heavy use - are made of hickory, and cut to proper length for turning (Fig. 4). The shaft is rounded in the center, the cutting edge being worked by a lever (Fig. 5). An inch and a half hole is bored thru the center of the handle and the lower part of the handle is shaped (Fig. 6). The handles

is shaped and cut to the proper thickness (Fig. 4). This is done in two different machines. They are then steamed to soften the wood after which the hand hole is cut out with a dye (Fig 5). From this machine they are taken to men who trim off the rough edges with drawing knives (Fig. 6). They are then taken to the wareroom, sorted, and bundled.

The whole process requires the work of eleven men and they turn out 180 dozen handles per day. The waste from the lathe is sold for kindling wood.

White ash is used entirely for these handles.

U. S. BOBBIN & SHUTTLE Co. AT LAWRENCE MASS.

Spools, bobbins, and shuttles for woolen mills are made in this plant.

Air dried lumber is prepared for the manufacture of these articles; but owing to the great demand for lumber and the scarcity of the supply a quicker method of seasoning is resorted to. The wood is turned out in the rough and the holes bored, before it is placed in the dry kiln, in order to prevent excessive checking. The temperature is raised gradually until the desired heat is reached.

Basswood, poplar, white birch, beech, and hard maple are used for bobbins, spindles and large spools. The very best grades of these woods must be used as the manufactured articles must be free from defects. Necessarily there is a large amount of waste of material in this mill.

For shuttles, dogwood, persimmon, and apple wood is used. For shuttles a hard strong wood is needed and the native woods



is shaped and cut to the proper thickness (Fig. 4). This is done in two different machines. They are then stacked to settle the wood after which the hand hole is cut out with a knife (Fig. 5). From this machine they are taken to men who trim off the rough edges with draw knives (Fig. 6). They are then taken to the warehouse, sorted, and banded.

The whole process requires the work of eleven men and they turn out 180 dozen handles per day. The waste from this is sold for kindling wood.

White ash is used entirely for these handles.

W. S. BOBIN & SHUTTLE CO., AT LAWRENCE, MASS.

Spools, bobbins, and shuttles for woolen mills are made at

this plant.

Air dried lumber is prepared for the manufacture of these articles; but owing to the great demand for lumber and the scarcity of the supply another method of seasoning is resorted to. The wood is turned out in the rough and the holes bored, before it is placed in the dry kiln, in order to prevent excessive checking. The temperature is raised gradually until the desired heat is reached.

Basswood, poplar, white birch, beech, and hickory are

used for bobbins, spindles and large spools. The very best grades of these woods must be used as the manufactured articles must be free from defects. Necessarily there is a large amount of waste of material in this mill.

For shuttles, basswood, persimmon, and apple wood is used.

For shuttles a hard cotton wood is used and for bobbins a hard cotton wood is used.



can not be used. Dogwood and persimmon is shipped from the south and much difficulty is encountered in securing sufficient quantities of these species.

The Lombard Steam Log Hauling Manufacturing Plant at Waterville, Maine was visited. Cuts of these Log haulers are shown in this report.

can not be used. Dogwood and persimmon is a good food for the  
south and much difficulty is encountered in its being a sufficient  
quantities of these species.

The Lombard Street Gas Plant Manufacturing Plant at  
Waterville, Maine was visited. Data of these factories are  
shown in this report.

Estimated cost of hauling logs with steam log hauler at No. 1 on canal, station, each ending.

| Days labor of men loading & unloading |   | at              | per day |
|---------------------------------------|---|-----------------|---------|
| "                                     | " | unloading       | "       |
| "                                     | " | with machine    | "       |
| "                                     | " | working on road | "       |
| "                                     | " | in camp         | "       |
| Board of men                          |   |                 |         |
| Labor of horses loading & unloading   |   | 1.00            |         |
| unloading                             |   | 1.00            |         |
| on road                               |   | 1.00            |         |
| Board of horses                       |   | 1.00            |         |

Estimated cost of road at \_\_\_\_\_ per cord

Cost of machine at \$0.75 per hr.

Total

Estimated \_\_\_\_\_ cost.

Cost per \_\_\_\_\_

\_\_\_\_\_ cost.





THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



**STOCK RE****Date** \_\_\_\_\_\_\_\_\_\_  
\_\_\_\_\_

**PORT.**

\_\_\_\_\_

**Operation.**

\_\_\_\_\_ **Clerk.**



THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



## Date \_\_\_\_\_

Clark

[illegible]





Week Ending.....

SCALED LOGS FOR HOLLINGSWORTH & WHITNEY CO.

Hauled From

Landed

Contractor

Percentage Discounted for Rot      Average Length of Logs

| Log Marks | No. Logs |             | Full & Sound Scale | Straight & Sound Scale |
|-----------|----------|-------------|--------------------|------------------------|
|           |          | Spruce Logs |                    |                        |
|           |          | Pine Logs   |                    |                        |
|           |          | Cedar Logs  |                    |                        |
|           |          |             |                    |                        |

Scaler.

HOLLINGSWORTH & WHITNEY CO.

HORSE

Farm.....

IEY C

ET

INSIDE

S

# NOTICE.

The following regulations must be carefully observed by all employees cutting on lands of this Company.

---

1. Roads must be swamped wide enough to allow the free passage of loads over them, AND NOT WIDER than twenty-five feet except when necessary in making turns.
2. Timber for bridges, corduroy and skids of all sorts must, when possible, be of hemlock, hardwoods, fir, or other unmerchantable material.
3. Scattering trees must be cut as they are met with in the regular course of cutting.
4. Any stick sound at both ends, ten (10) feet long or over, and five (5) inches or over in diameter at the small end shall be considered a merchantable log.
5. When logs are being cut ALL SPRUCE TREES TWELVE (12) INCHES AND OVER IN DIAMETER BREST HIGH AND CONTAINING A MERCHANTABLE LOG MUST BE CUT. ALL FIR TREES EIGHT (8) INCHES AND OVER IN DIAMETER BREST HIGH AND CONTAINING A MERCHANTABLE LOG MUST BE CUT.
6. NO TREES OF ANY DIAMETER SMALLER THAN THAT SPECIFIED SHALL BE CUT, excepting when absolutely necessary in swamping roads, yards, landings, etc.
7. All merchantable logs contained in undersized trees which have to be swamped from roads, yards, landings, etc., must be hauled.
8. All dry spruce containing a merchantable log must be cut.
9. TREES MUST BE CUT DOWN AT A POINT NEVER HIGHER THAN THE SWELL OF THE ROOTS and never higher than 10 inches above ground except when rotten butted.
10. Snow must be shovelled from the bases of trees to permit cutting at the specified height.
11. Whenever possible the saw must be used in felling and cutting up trees.
12. Trees must be thrown so that the fewest possible undersized trees will have to be cut to get the log or logs out.
13. In butting off, merchantable material must not be left in butts.
14. ALL TREES MUST BE RUN TO A DIAMETER OF FIVE (5) INCHES IN THE TOPS WHEN THE TOPS ARE SOUND. If not sound, trees must be topped at the point where they become sound.
15. No trees must be left lodged.
16. Short logs must be cut when groups of undersized trees will have to be cut to get long logs out.
17. Trees containing merchantable logs must not be cut up in such a way that they, or any part of them, become too short to haul or make them unmerchantable.
18. Yards must be cut back only as fast as space is needed, and must never be wider than necessary.
19. Head blocks or bed pieces for yards may be of any kind of timber, but if of merchantable material, must be so laid that all of them can easily be hauled off at the proper time.
20. Yards must be so made that logs at the bottom will not be covered by snow thrown from the top.
21. Logs spilled from yards or sleds when being loaded onto wagon sleds must be picked up at once.
22. All merchantable logs must be cleaned from yards as hauling off progresses. Odd logs and merchantable bed pieces or head blocks must not be left to be cleaned up later.

**GREAT NORTHERN PAPER COMPANY.**

Week Ending .....

# SCALED LOGS FOR HOLLINGSWORTH & WHITNEY CO.

Hauled From

Landed

Contractor

Percentage Discounted for Rot      Average Length of Logs

| Log Marks | No. Logs |             | Full & Sound Scale | Straight & Sound Scale |
|-----------|----------|-------------|--------------------|------------------------|
|           |          | Spruce Logs |                    |                        |
|           |          | Pine Logs   |                    |                        |
|           |          | Cedar Logs  |                    |                        |
|           |          |             |                    |                        |

Scaler.





# SCALED LOGS FOR HOLLINGSWORTH & WHITNEY CO.

Hauled From

Landed

Cut in Winter of and

Average Length of Logs

Percentage Discounted for Bark

Contractor

Log Marks

No. Logs

CUBIC FEET

OUTSIDE BARK

INSIDE BARK

Spruce Logs

Pine Logs

Cedar Logs

Scaler.



**HOLLINGSWORTH & WHITNEY CO.**

## HORSE REPORT.

**Farm** \_\_\_\_\_

**Operation**\_\_\_\_\_ **Date**\_\_\_\_\_191

M111 \_\_\_\_\_ 1

**Hollingsworth & Whitney Co., Greenville Junction, Maine.**

**We have this date sent the following Horses to**

**They Worked, Boarded, Pastured here as follows:**

[illegible]

**We have this date received from**\_\_\_\_\_

**Horses Numbered**\_\_\_\_\_

Remarks \_\_\_\_\_

8-7-00 1m

**Clerk,**

THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



SPRUCE WOOD DEPT.

DR.

CR.

BAKER-YAWTER CO., MANUFACTURERS NEW YORK, CHICAGO.

PATENTED APRIL 11, 1906.

[illegible]

**GREAT NORTHERN PAPER CO.**

**SPRUCE WOOD DEPT.**

**STOREHOUSE STOCK LEDGER**

CR.



**Great Northern Paper Co.**

DATE

BAKER-VAMT





# Great Northern Paper Co.

SPRUCE WOOD DEPARTMENT

## MONTHLY HORSE REPORT.

..... Operation. Month of ..... 190

..... Clerk.

Number of Horses on hand on first day of Month .....

Number of Horses on hand on last day of Month .....

Horses received during the month and place or operation received from .....


### DESCRIPTION:

No. ....

Horses shipped away during month and place or operation shipped to .....

### DESCRIPTION:

No. ....

 This report must be made out on the last day of each month and mailed to the Bangor Office.







Survey for

Logs hauled from

Landed or Yarded

Re

Town

Date

Name

Home

Age

How

How

What

Extent

MARKS

NO. OF LOGS

DESCRIPTION

Spruce

Fir

Cedar

Pine

Spruce

Has the Injured Person any Insurance\_\_\_\_\_

What has the Injured Person said about the Accident. If

Any Expenditures Made\_\_\_\_\_ Amount and

Witnesses of the Accident\_\_\_\_\_

What disposition made with Person or Body\_\_\_\_\_

Remarks\_\_\_\_\_

Signed\_\_\_\_\_

Report all Accidents, However Slight, Promptly to Hollingsw

*Survey for**Week Ending**19**Logs hauled from**Landed or Yarded*

| MARKS | NO. OF LOGS | DESCRIPTION   | SOUND SCALE |  |  | TOTAL STICKS | TOTAL FEET |  |  |
|-------|-------------|---------------|-------------|--|--|--------------|------------|--|--|
|       |             |               |             |  |  |              |            |  |  |
|       |             | <i>Spruce</i> |             |  |  |              |            |  |  |
|       |             | <i>Fir</i>    |             |  |  |              |            |  |  |
|       |             | <i>Cedar</i>  |             |  |  |              |            |  |  |
|       |             | <i>Pine</i>   |             |  |  |              |            |  |  |
|       |             | <i>Spruce</i> |             |  |  |              |            |  |  |
|       |             |               |             |  |  |              |            |  |  |

*Surveyor*

**Report of Accident to Employee.**

**No.** \_\_\_\_\_

**Town** \_\_\_\_\_

**Camp** \_\_\_\_\_

**Date** \_\_\_\_\_ **19** \_\_\_\_\_

**Hour** \_\_\_\_\_ **M.** \_\_\_\_\_

**Name of Injured Person** \_\_\_\_\_

**Home Address** \_\_\_\_\_

**Age** \_\_\_\_\_

**Married or Single** \_\_\_\_\_

**How Employed** \_\_\_\_\_

**How long in Service** \_\_\_\_\_

**What was he doing at time of Accident** \_\_\_\_\_

**Extent and Cause of Injury (Describe in detail)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Has the Injured Person any Insurance** \_\_\_\_\_ **Amount** \_\_\_\_\_

**What has the Injured Person said about the Accident. If Anything** \_\_\_\_\_

\_\_\_\_\_

**Any Expenditures Made** \_\_\_\_\_ **Amount and what for** \_\_\_\_\_

\_\_\_\_\_

**Witnesses of the Accident** \_\_\_\_\_

\_\_\_\_\_

**What disposition made with Person or Body** \_\_\_\_\_

\_\_\_\_\_

**Remarks** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Signed** \_\_\_\_\_





Form No. 99

\$ \_\_\_\_\_

Bangor, Me., \_\_\_\_\_ 190

Received from **GREAT NORTHERN PAPER CO.**  
on account of \_\_\_\_\_

\_\_\_\_\_ Dollars

Form No. 22.

\$

Bangor, Me.,

19

TO THE GREAT NORTHERN PAPER CO.,

Please pay to

Dollars,

and charge the same to me an account of contract.

Received of the Great Northern Paper Co., the above amount in full.

No.

190

## GREAT NORTHERN PAPER CO.

61 Morse-Oliver Building, BANGOR, ME.

Please pay

for labor on

Logs marked

as follows:

\_\_\_\_\_ days at \$

per month,

\$

Less Cash,

" Goods,

Total,

and charge same to me on account of contract.

Balance due,

Received of Great Northern Paper Co. the above amount in full,

Operation

No.

190

## Great Northern Paper Co.

To

Dr.

For

days' labor at \$

per month

\$ cts.

Less Cash charged,

" Goods "

Total

Received Payment,

Balance due,

Clerk



THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.





THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.

" Spring Pole

THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



This image shows a blank, cream-colored page, possibly a separator or endpaper from a book. The page has a slightly textured appearance and faint horizontal lines running across it. There is no text or other markings on the page.

PIECES=

FEET

BAKER-VAVTER CO., MANUFACTURERS NEW YORK, CHICAGO.

| DISTRIBUTION OF PAY ROLL |      |        | PRODUCING | EXPENSE | GENERAL EX |
|--------------------------|------|--------|-----------|---------|------------|
| SYMBOL                   | DAYS | AMOUNT |           |         |            |
| F                        |      |        |           |         |            |
| G                        |      |        |           |         |            |
| C <sup>2</sup>           |      |        |           |         |            |
| C <sup>3</sup>           |      |        |           |         |            |
| G                        |      |        |           |         |            |
| T                        |      |        |           |         |            |
| T <sup>2</sup>           |      |        |           |         |            |
| B                        |      |        |           |         |            |
| R <sup>2</sup>           |      |        |           |         |            |

THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.

OPERATION

CAMP

## LABOR REPORT

DATE

19

NAME

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17

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19

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21

22

23

24

25

26

27

28

29

30

31

DAYS

RATE

WAGES

CASH %

WANDIN %

CLERK

## PRODUCTION

PIECES=

*FEET*





THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.

The sum of these sheets should equal the total output during the month. Make out this report in pencil so that a carbon copy can be kept in the camp.

FORM NO. 40.

AMOUNT

P. O. NO.

Form No. 46 7-19-07 3m

Week Ending .....

**SCALED LOGS FOR HOLLINGSWORTH & WHITNEY CO.**

Hauled From .....

Landed .....

Contractor .....

Percentage Discounted for Bark.      Average Length of Logs.

| Log Marks | No. Logs |  |             | CUBIC FEET   |  |  |             |  |  |
|-----------|----------|--|-------------|--------------|--|--|-------------|--|--|
|           |          |  |             | OUTSIDE BARK |  |  | INSIDE BARK |  |  |
|           |          |  | Spruce Logs |              |  |  |             |  |  |
|           |          |  | Pine Logs   |              |  |  |             |  |  |
|           |          |  | Cedar Logs  |              |  |  |             |  |  |
|           |          |  |             |              |  |  |             |  |  |

Scaler.



SPRUCE WOOD DEPT.

The sum of these sheets should equal the total output during the month. Make out this report in pencil so that a carbon copy can be kept in the camp.

## ISSUED TO

OPERATION CAMP NO.

FROM

## STOREHOUSE

BAKER-YAWTER CO., MANUFACTURERS NEW YORK, CHICAGO

## FORWARD



THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



Four Foot Pulp Wood as Piled at G.N.P.Co. at Madison.



Spruce and Fir Logs at Madison.





Team Decending Hill at Camp No.1



Team at Bottom of Hill at Camp No.1.







Yard at camp No.2.



Yard at Camp No.2.





Cook-house and Mens' Room.



Office at Camp No. 1.







The Stable Camp No.1.



The Feed Shed Camp No.1.







Tote Team.



Tote Road.





Landing at Holeb Pond.



Mr. MacKay, Scaler at Holeb Pond.







Yard at camp No.2.



Yard at Camp No.2.





Hauling from Yard to Landing.



Yard at Camp Np.1.







Hauling from Yard to Landing.



Building of Yard.







Great Northern Paper Co. Pulp Mill at Madison Me.





Ice Road Sprinkler.



Road Drag.







Blacksmith-shop at Camp No.1.



Saw-filer and Equipment at Camp No.1.





Mr. Brubaker Snubbing Sled at Hill near Landing at Camp No. 1.



Hill back of Camp No. 2.







Spruce and Fir Type.



Poplar and Birch Growth Coming in After a Fire.







Region after Burn and Windfall.



Swamping Road through Windfall.





Mr. I.T.Yarnall.



Mr. J.R.Brubaker.







View of Kennebec River at Madison Me.



Dam in Kennebec River at Madison Me.





**THE LOMBARD**  
**STEAM**  
**Log Hauler Co.**  
**WATERVILLE, MAINE**

---

**PATENTS**

United States, May 21, 1901  
Dominion of Canada, July 16, 1901  
United States, May 21, 1907  
Dominion of Canada, Nov. 19, 1907  
Foreign Patents Pending

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TELEPHONE 234-1

**A. O. LOMBARD**  
Inventor and General Manager









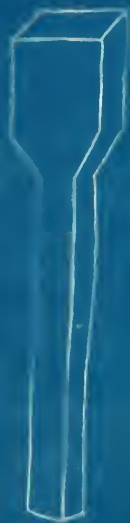


fig. 1



fig. 2



fig. 3



fig. 4



fig. 5



fig. 6



THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.



THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

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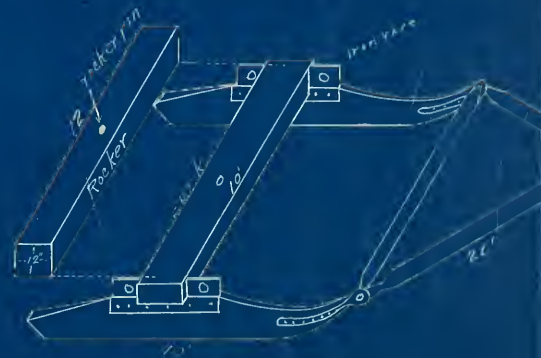
STATE COLLEGE, PA.



Wagon Sled



Sled for Steam Log Hauler



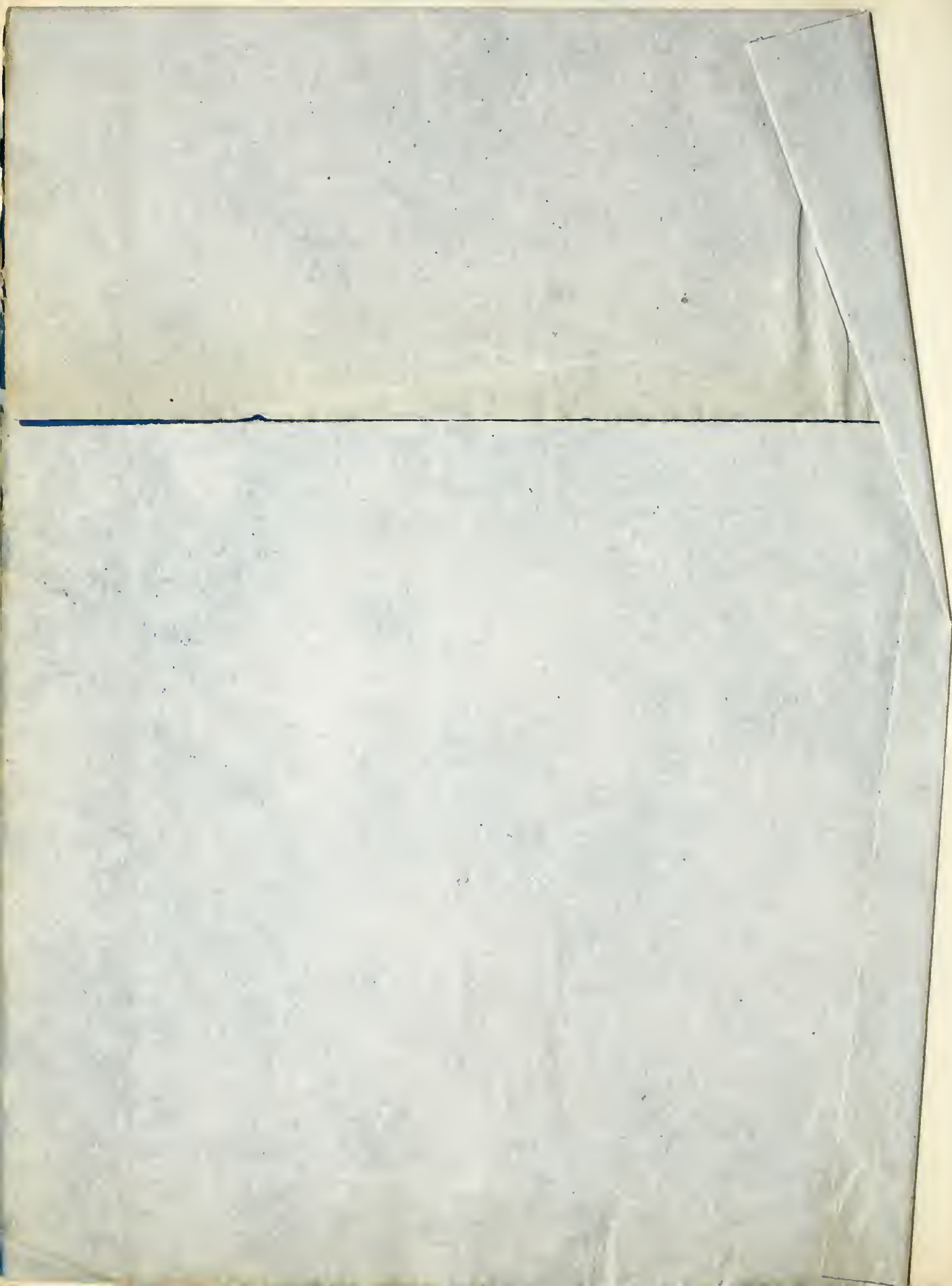
THE PENNSYLVANIA STATE COLLEGE  
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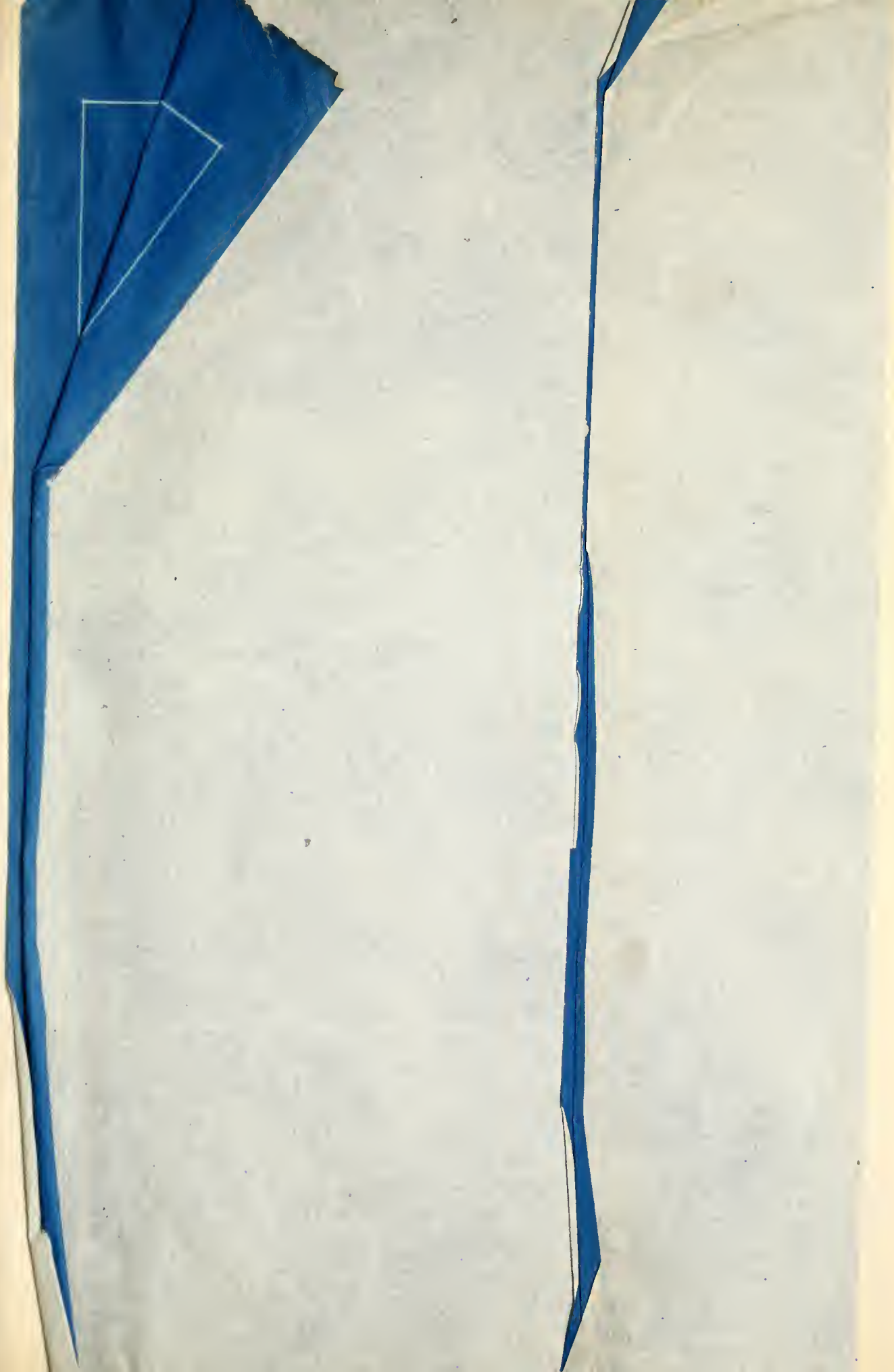
DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.

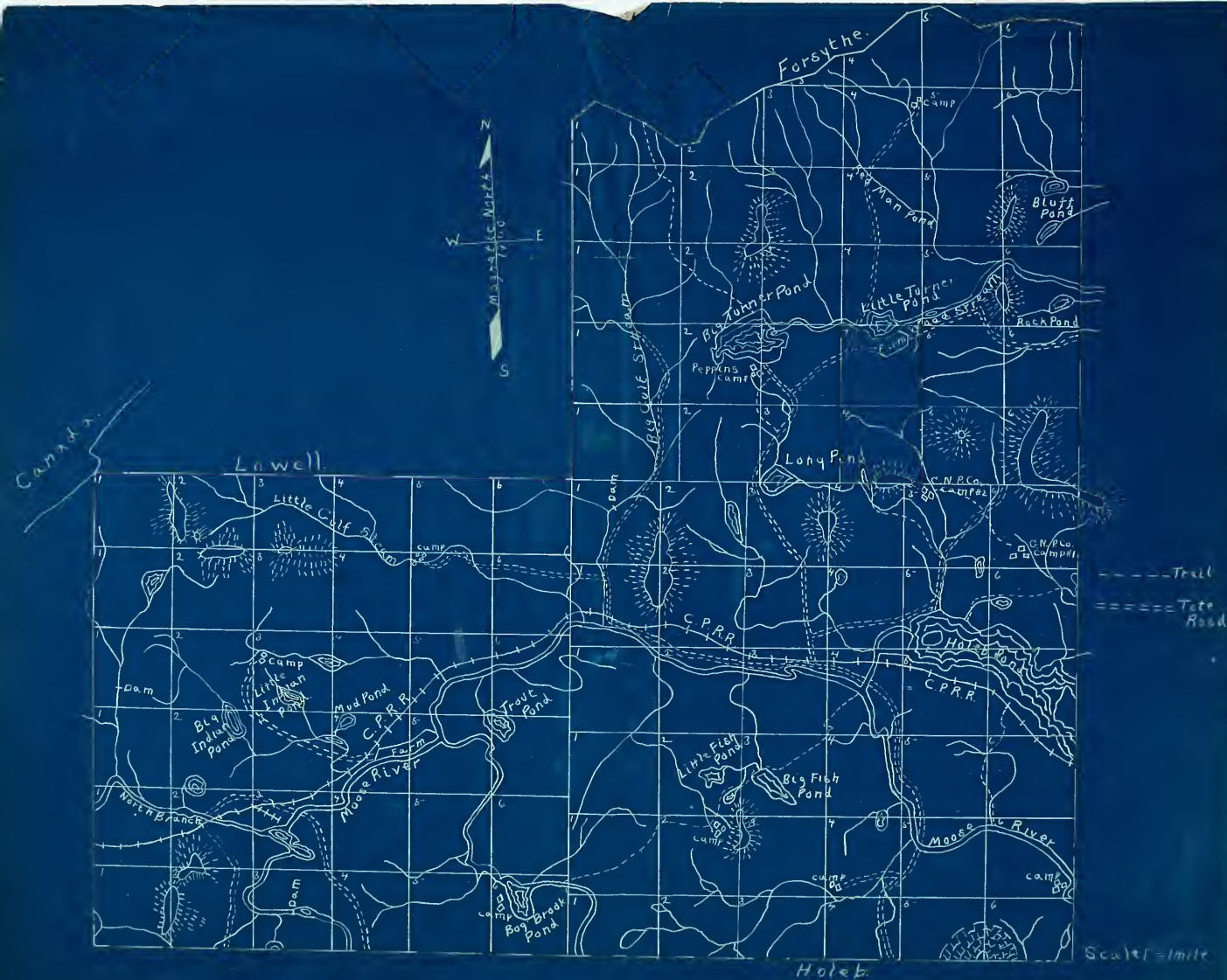


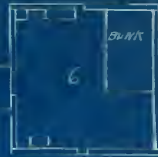
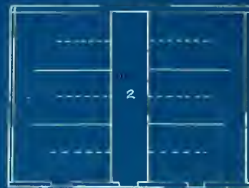
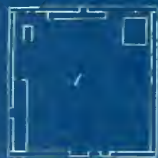
THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION











Toteroad

- SCALE: 1" = 10'
- 1 BLACKSMITH SHOP
  - 2 STABLE
  - 3 STOR. HOUSE (Hay & Tools)
  - 4 MEN'S ROOM
  - 5 FOOD HOUSE
  - 6 BRIDGE
  - 7 DISC. 1"

PLAN  
of  
CAMP No. 1  
G.N.P. Co.

4000 1-1-18

THE PENNSYLVANIA STATE COLLEGE  
SCHOOL OF AGRICULTURE AND EXPERIMENT STATION

DEPARTMENT OF FORESTRY

STATE COLLEGE, PA.

REPORT

\*\*\*\*\*

Of

\*\*\*\*\*

THE J.E.HENRY & SONS LUMBER COMPANY.

LINCOLN, NEW HAMPSHIRE.

\*\*\*\*\*

By

\*\*\*\*\*

J.E.Ingram.

\*\*\*\*\*





## The White Pine and Spruce Region of New England.

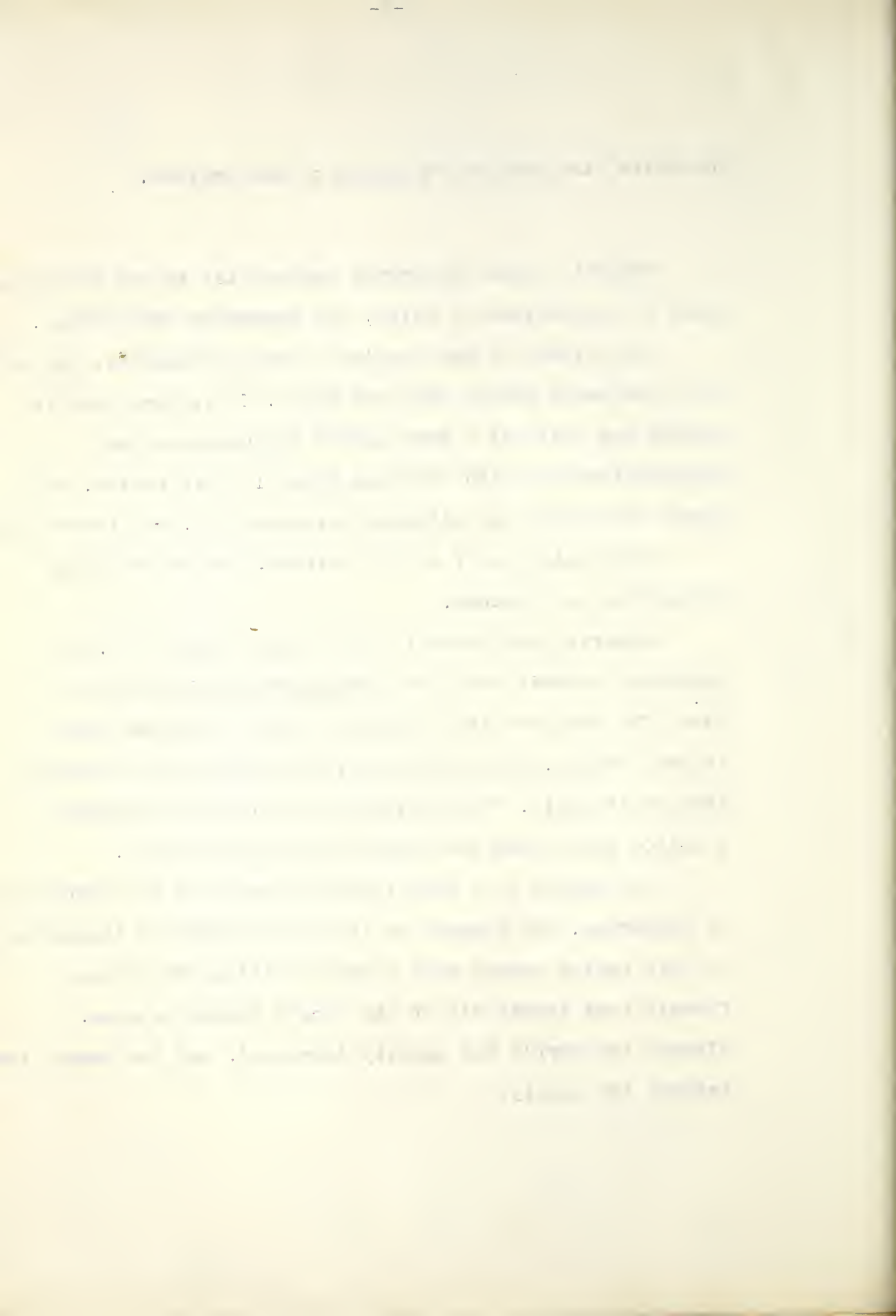
The White Pine and Spruce region lies in the northern part of New England in Maine, New Hampshire and Vermont.

The climate of this region is very changeable, due to the cold waves coming from the ocean. It is very cold in winter and this has a very marked influence on the distribution and kind of trees found in this region. Only those trees that can withstand extreme cold, can thrive here.

The country is of a hilly nature, but no very high elevations are reached.

Lumbering was begun in this region about 1850. The lumbering methods have not changed very much since that time. The logs are still hauled on bobs over snow roads to the landing, where they are put on cars which transport them to the mill. The conditions are such that scarcely a method other than the present one could be used.

This region is a very important one from the standpoint of lumbering. The demands of the great number of industries in this region caused such a rapid cutting off of the forests that almost all of the virgin timber is gone. Already the supply has greatly decreased, and the demand far exceeds the supply.

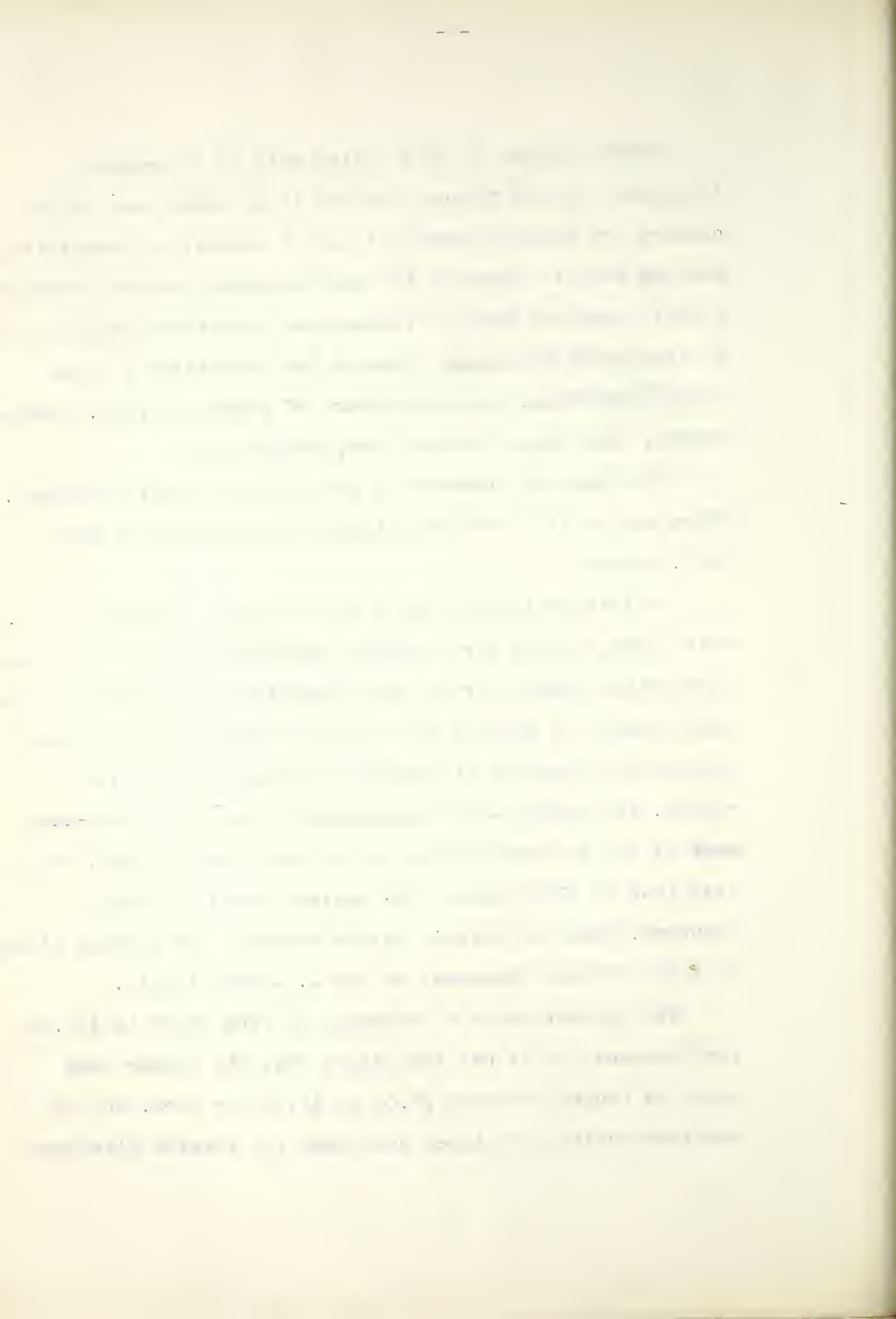


These forests of this region will be of special importance in the future, because in no other part of the country are there so many and such a variety of industries needing wood to carry on the manufacturing process. There is a vast amount of money invested, and the timber supply will be absolutely necessary. Some of the industries in this region <sup>are</sup> lumbering, the manufacture of paper and pulp, spools, bobbins, shoe pegs, clothes pins, vaneer etc.

The lands are owned by a few people in small holdings. There are still a few large tracts such as the one owned by J.E.Henry.

In this region we find a mixed forest of black spruce, white pine, balsam fir, hemlock, paper birch, gray birch and a few other species of no great importance. From 75% - 90% of the forests are made up of coniferous trees, chiefly black spruce which reaches its maximum development in this region. The percentage of hardwoods slight<sup>-ly</sup> decreases ~~very~~ <sup>as</sup> you go from the valleys to the mountain tops. This is also true of the hemlock. The maximum stand is twenty thousand. However, this is seldom reached. The average stand is about fifteen thousand( On the J.E.Henry tract).

The present value of stumpage is from \$6.00 to \$10.00 per thousand. It is not long since that the timber land could be bought for from \$5.00 to \$6.00 per acre, but the reckless cutting of timber soon made the forests disappear



and caused a rapid rise in the stumpage value. The many and excellent markets located in this region also aided in raising the stumpage value. At the present time very little timber land is for sale.

People are beginning to see the value of their forests and many of them are holding back by using the conservation cutting system.

The many rivers which are found in this region are used very extensively for water power. Without the forests, the runoff water can not be very well regulated. From this standpoint as well as from that of lumbering, the forests are of the utmost importance.



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THE  
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PART 1  
1888  
LONDON  
PUBLISHED BY THE  
Royal Society  
1888

### The White Mountains.

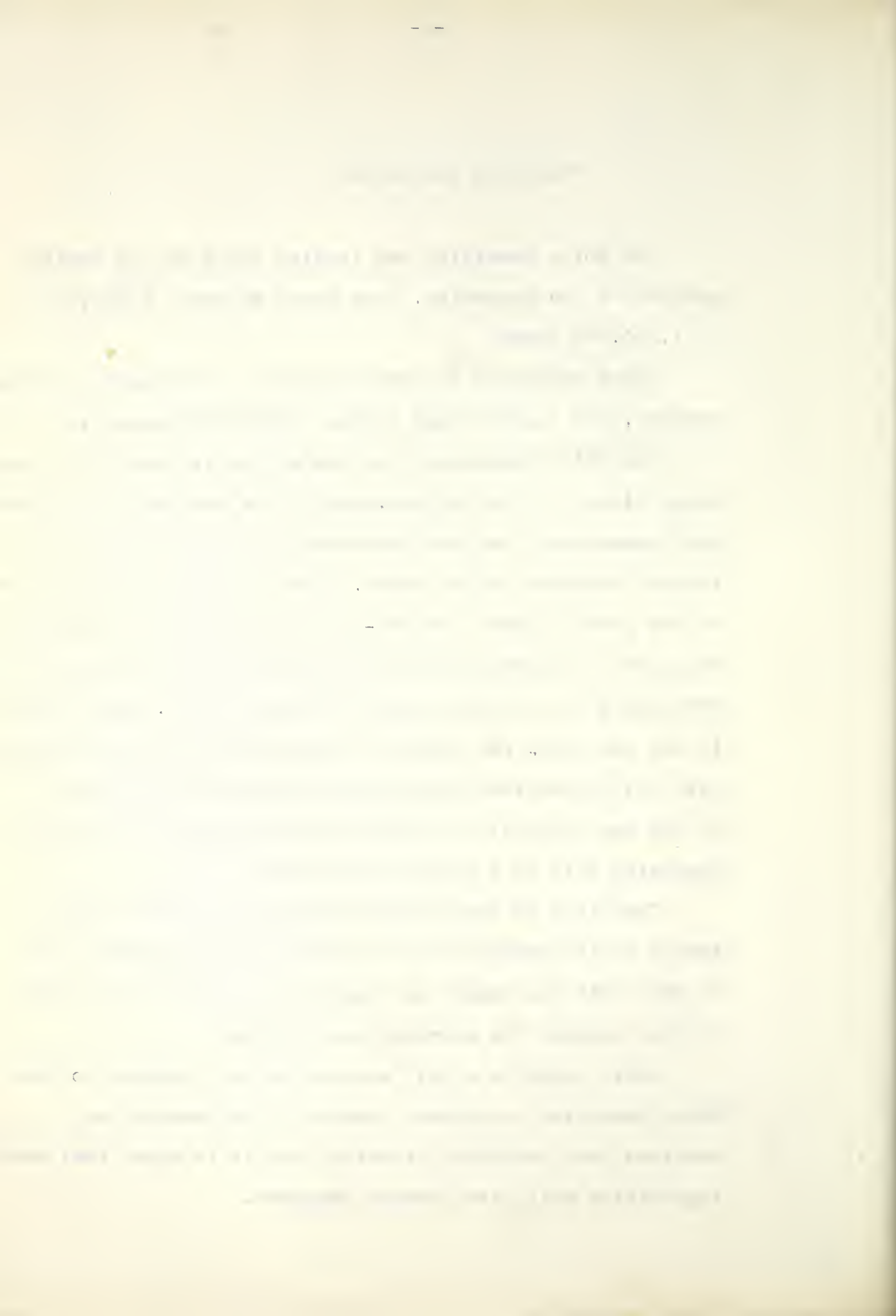
The White mountains are located north of the central portion of New Hampshire. They cover an area of 800,000 to 1,000,000 acres.

These mountains are known all over the country for their scenery, and a great many people visit them annually.

The White mountains form the collective basin for four large rivers in New England, namely, The Merrimack, the Saco, the Connecticut, and the Androscoggin. All of these rivers furnish excellent water power. Unless a forest cover is retained on the steep slopes, the run-off water cannot be successfully regulated, a condition which would materially decrease the efficiency of the water power of these rivers. Such, however, is not the case, the lumber is being cut off at an increased rate and unless some precautionary measures are adopted in the near future, the beauty and usefulness of the White mountains will be a thing of the past.

The State of New Hampshire had taken steps to make them a state preserve but no satisfactory agreement could be made with the owners in regard to the price to be paid. On this account the movement was dropped.

Quite recently a bill was put before congress to make these mountains a national reserve. This measure has received very favorable attention and it is hoped that such legislation will pass through congress.



The characteristics of the White mountains are:

- (1) A good forest growth.
- (2) Numerous beautiful lakes and streams.
- (3) Collective basin for four large rivers.
- (4) Summer resorts scattered throughout the region.
- (5) Abundance of fish and game.

THE UNIVERSITY OF CHICAGO PRESS

CHICAGO, ILLINOIS 60607

1984

1985

1986

1987



The J.E.Henry and Sons Company.

This company is composed of J.E.Henry, the senior partner and his three sons, George, John and Charles. They are the largest holders in the White Pine and Spruce region of New England. Considering all of their timber lands, they are the largest lumber concern in the United States. Their lumber tract in the White mountains covers an area of 375,000 acres.

J.E.Henry, the senior partner, began his career as a dealer in lumber about thirty years ago. He started on a small scale increasing his land holdings as much as his investments would allow. This was the basis on which the present concern was built.

George Henry looks after the woods operations. He keeps in personal touch with the work that goes on in the woods from the smallest jobs to the planning of the work which is to be carried on. Mr. Henry goes up into the camp several times a week.

John Henry looks after the manufacturing part of the business. He is an expert paper maker and he directs all operations in the mills.

Charles Henry who is in very poor health, travels quite extensively looking after the other lands of the company.

The office and plant is located at Lincoln which is connected with the commercial world by a branch of the

REPORT OF THE COMMITTEE ON THE PRACTICE OF MEDICINE

The American Medical Association has been deeply concerned in the recent past with the problem of the practice of medicine. It has been particularly interested in the question of the regulation of the medical profession, and in the recent years has been actively engaged in a campaign for the enactment of laws to regulate the practice of medicine in the various States. The committee on the practice of medicine, which was organized in 1915, has been the principal organ of the Association in this work. It has held numerous conferences, and has issued many reports and resolutions. Its work has been of great value to the Association and to the medical profession generally.

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Boston & Maine railroad and a long distance telephone.

The company is exceedingly well organized. They have a large office force to carry on the financial business and a large crew to carry on the manufacturing work. Every cent is accounted for. The company knows just what every operation is costing them.

Up to within the last few years, they manufactured lumber exclusively. Five or six years ago a small paper mill was erected as an experiment, and <sup>they</sup> found that the manufacture of paper brought greater returns than that of lumber. At the present time the only lumber that is saved is that from the hemlock, which cannot be used for paper, and from the spruce required for their own use.

The company owns several very large lumber tracts. They have 375,000 acres in the White mountains, several hundred thousand acres of Redwood in California, a large tract of black walnut in Texas and New Mexico and a large holding of timber on the Canadian frontier. They are estimated to be worth from \$30,000,000 to \$40,000,000. They also belong to the American Lumber Association.

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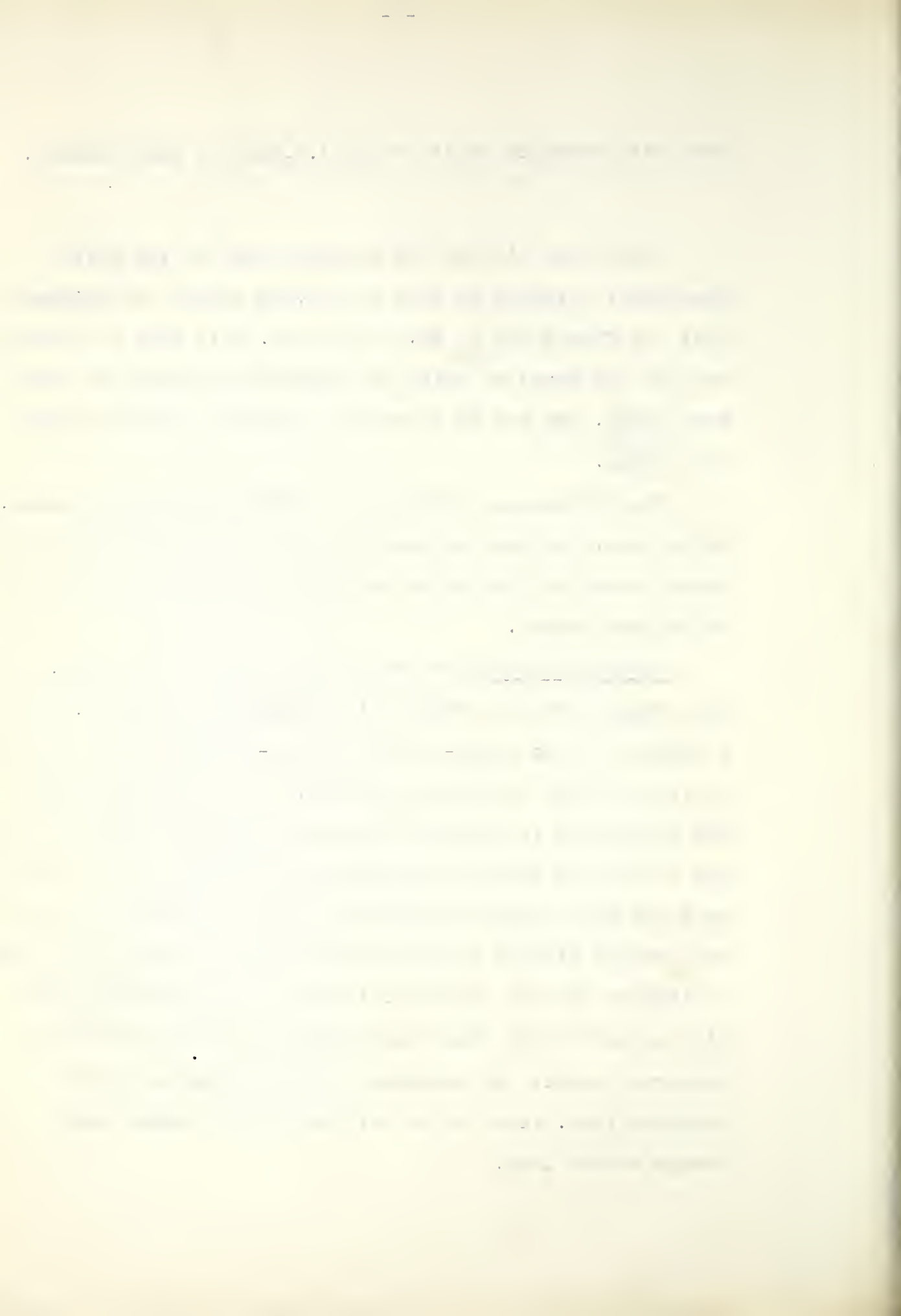
The White Mountain Tract of the J.E. Henry & Sons Company.

This tract lies in the northern part of the White mountains, covering an area of 375,000 acres. The original cost was from \$5.00 to \$6.00 per acre, this cost referring only to the lands on which the coniferous species of trees were found. There was no first cost connected with the hardwood <sup>open</sup> areas.

The forests are composed of a mixture of black spruce, white pine, hemlock, balsam fir, gray birch and paper birch. Beech, maple and arborvitae are found occasionally but are of no great value.

The Black Spruce makes up about 75% of the stand. In this region the tree reaches its maximum development. It attains a height of from sixty-five to eighty-five feet and a diameter of from fifteen to eighteen inches. It is propagated from the seed which is produced in great abundance. This tree is one of the few that can withstand severe cold. It is found very far north along the eastern coast of Canada. The tree very seldom attains a height exceeding one hundred feet and a diameter of over two feet. It has a clean, <sup>tapering</sup> straight <sup>^</sup>bole with a small crown. The black spruce is found throughout the tract equally as abundant in the valleys as on the mountain tops. Fire is the only agent that causes any damage to the tree.





The White Pine. forms about 3% of the stand. It is found more on the mountain slopes and tops than in the valleys. It seldom reaches a very large size. It attains a greater height than the spruce and in many cases a white pine can be distinguished by the fact that its top extends far above the spruces.

The Balsam Fir is found distributed equally over the tract. It forms about 7% of the stand. The balsam fir never reaches any great diameter or height. It has a clear, straight, tapering bole and a very small crown like the spruce. It is harmed only by fire.

The Hemlock is found mostly in the valleys near the streams. This tree like the white pine does not attain a very good development and is <sup>not</sup> considered as a very important forest tree.

The Birches are found scattered about with the spruces. They are more prominent in the valleys than on the mountains. The birches reach a diameter of from twelve to sixteen inches and a height of about sixty feet. They usually have a short bole, unless they are found in a very dense place. They form about 7% of the stand.

The species found on this tract:

Black Spruce ( *Picea mariana* )

White Pine ( *Pinus strobus* )

Hemlock ( *Tsuga canadensis* )

Balsam Fir ( *Abies balsamea* )



White Cedar ( *Thuja occidentalis*)  
Gray Birch ( *Betula lutea*)  
Paper Birch ( *Betula papyrifera*)  
Birch ( *Fagus americana*)  
Maples (Acor)  
Cherry(Bird)--(*Prunus pennsylvania*)

The bird cherry is found on lands which have been burned over.

About 150,000 acres have been cut over. Clear cutting was practised universally over the tract leaving no seed trees <sup>for future</sup> reforestation. There is very little reproduction and hence the land that has been cut over is almost worthless. The land is lying idle and could hardly be used for anything.

The tract has been lumbered for the past eighteen years. An annual cut of <sup>feet</sup> 15,000,000 <sup>^</sup> was made. The company estimated that the remaining timber will last for twenty-five or thirty years. I think that a certain number of seed trees should be left standing on each acre. More conservative methods of lumbering should be practised. I do not think that the diameter limit could be used to any advantage in this region. The logs are converted into pulp so that there is little waste. I think that the future growth would not warrant the use of the diameter limit when the inconvenience was considered.

The tract is protected from fire in several different ways which prove to be quite effective. Only about 10,000





acres has been burned over. State and private fire notices are placed in all conspicuous places over the tract.

During the dry seasons when the danger of fire is greatest, men on railroad bicycles follow the log engines continually, ever watchful for the out break of fires. The engines are equipped with ash catchers.

Men who go to hunt in this region are closely watched. Sometimes the company even sends out a man to keep watch over strangers.

The cost of fire protection ranges from two to five cents per thousand feet.

In this region, lumbering is carried on throughout the entire year.



## The Manufacturing Plant.

The manufacturing plant is located at Lincoln. The only reason for this location seems to be the close proximity to the woods operations. The plant including the pond covers from eight to ten acres. It consists of a saw mill, pulp mill and a paper mill.

### The Saw Mill.

The mill is of modern construction having two band saws, two edgers, live rolls, planers and all other necessary machinery for a modern mill. At present only one side of the mill is running. When the mill is running on full time it has a sawing capacity of from 140,000 to 160,000 feet per day. The mill is used only to cut the large logs into pulp wood dimensions. After the logs are sawed into the proper shapes, they are conveyed by live **rolls** to the saws which cut them into the proper lengths. From these saws, the bolts are conveyed to the pulp mill where they are trimmed (the bark taken off) and sawed into still shorter lengths. About 50,000 feet per day represents the amount of wood which is of such size that it cannot be handled at the pulp mill.

There is a railroad through the middle of the dam. Here the logs are unloaded, the large ones on one side and the small ones on the other.



### The Pulp Mill.

This plant has its own sawmill. The logs are cut up into four foot lengths by means of band saws. After this the cut pieces are conveyed by means of an endless chain to the trimmers where they are sawed into smaller lengths after the bark has been taken off. They are now ready for the chipper, in which they are cut into the form of chips. These chips are now conveyed by means of an endless chain to a bin located above the digestors. The chips are later put into the digestors each of which has a capacity of twenty-four cords. After calcium sulphite is put upon them they are boiled under a pressure of forty-seven pounds for eight hours. After this period of time has elapsed a pipe is attached to the bottom of the digester which conducts the contents to a bin. When the valve is opened, the pulp rushes out with great force under the influence of the pressure in the digester.

This bin has a substantial iron construction where the pulp strikes it. The mass is now washed until all acid and soluble matter has been removed. This process requires several hours.

The pulp is now ready to be rolled. It passes through a number of rollers which squeeze out the water and press the fibers together. In this process there are two wooden rollers working against a rubber one. The pulp is now ready to be shipped to the paper mill.

The paper pulp is carried to the paper mill by an endless chain conveyor. The pulp is put into the beaters where is





worked up into a mush-like mass by means of a fan shaped beater. After this operation it is conveyed into large casks where it is kept until it is used. When the pulp is used, it is pumped up to the main floor again by means of a regulator. By this means the exact amount of material is conveyed to the paper machines. An endless, moving mat conducts it to the rollers where the pulp is made thinner and tougher in addition to having the water pressed out of it. After going through this process, it is finished. The paper is then run on large cylinders, thirty in all, where it is dried. The cylinders are so connected with steam pipes that they are always very hot. After this drying process the paper is rolled into rolls ranging in weight of from eighteen to two thousand pounds. These rolls are then taken to another machine which re-rolls it into bundles of different dimensions, after which it is packed and ready for the market.

#### The $\text{CaSO}_3, 2\text{H}_2\text{O}$

Calcium sulphite is used in this process. The company manufactures this compound themselves, buying the constituent sulphur and lime in great quantities.

The sulphur is burned in retorts and the gas  $\text{SO}_2$  is caught and conveyed to a cooler after which it is ready to be mixed with the lime solution. The lime  $\text{CaO}$  is mixed with water and the mass is pumped up to the top of one of four big tanks. Here it is met by the  $\text{SO}_2$ . These combine and



form  $\text{CaSO}_3$  with an excess of  $\text{CaO}$ . This is then led into a tank below where it is met by more  $\text{SO}_2$  which combines with the  $\text{CaO}$ . This process continues until all of the  $\text{CaO}$  is satisfied and then a perfectly colorless solution of  $\text{CaSO}_3 \cdot 2 \text{H}_2\text{O}$  is obtained. The sulphite is then stored in a tank ready for use.

Two to three hundred men are employed at the mills. The average wages amount to \$1.35 to \$1.45 per day.

All waste is utilized as fuel but this is only a small part of the fuel consumed. The last <sup>year's</sup> ~~last~~ coal bill of the company amounted to \$75,000. There are about twenty boilers and the total horse power of the engines is two thousand, two hundred.

The plant is well equipped with fire apparatus. Hose, pails and water plugs are scattered throughout the plant. <sup>and</sup> Fire alarm boxes are placed in all conspicuous places. The employees of the company have organized a fire department. The plant is highly insured.





### The Manufactured Products.

Up to within the last five or six years, the company turned out nothing but lumber. At the present time nothing but paper and paper pulp are put upon the market. Experiments showed that the investment was the more profitable to the company if all of the timber was manufactured into the paper and pulp.

Formerly an average of about 95,000,000 feet of black spruce was cut annually. During the last year 45,000,000 feet were cut.

The products turned out upon the market by the company are paper, paper pulp and the lumber for their own use. From twenty-five to thirty thousand tons of paper are manufactured yearly. The remainder of the logs are sold in the form of paper pulp excluding the timber for their own consumption.

Their chief and best market for these products is Boston. One of the strong points underlying the success of this company is the rapidity with which they are able to put their products upon the market. Trees may be cut in the woods in the morning, transported to the mill in the afternoon and manufactured into paper during the night. The paper may then be placed in cars and arrive in Boston the following afternoon. Conditions here are markedly contrasted to those in Maine where it requires almost a year from the time the timber is cut until the manufactured products



are placed upon the market.

I think that the company pays \$15.00 freight on each car from Lincoln to Boston. From 15 to 20 tons of paper can be loaded into one car. The cost of manufacturing the paper ranges from \$5.00 tp \$7.00 per ton. The cost of the logs is \$4.51 at the mill. The company realizes from \$50.00 to \$60.00 on each ton of paper placed upon the market. The paper manufactured is several grades of wrapping paper.



### The Town.

There are about one thousand people at Lincoln. The company owns every building in the place with the exception of the clothes pin factory.

Lincoln is situated in a timbered section of country on a branch road of the Boston and Maine railroad connecting it with Plymouth.

The government is in the hands of the company which rules the place as it sees fit. With their consent, one person may sell beer without a license. Another person may try the same and be immediately prosecuted .

Lincoln is a very quiet place and would afford exceedingly good accomodations for a person of nervous temperament.

There is only one store in the town and this is owned by the company which gives them a monopoly on the trade. This store carries a full line of articles which are commonly found in a department store. The employees generally purchase goods on account and this is then deducted from their pay at the end of the month.

Two years ago the town sustained a severe loss by fire, all the buildings on the main street being burned. The town is equipped with street lights, police station, fire department and churches.



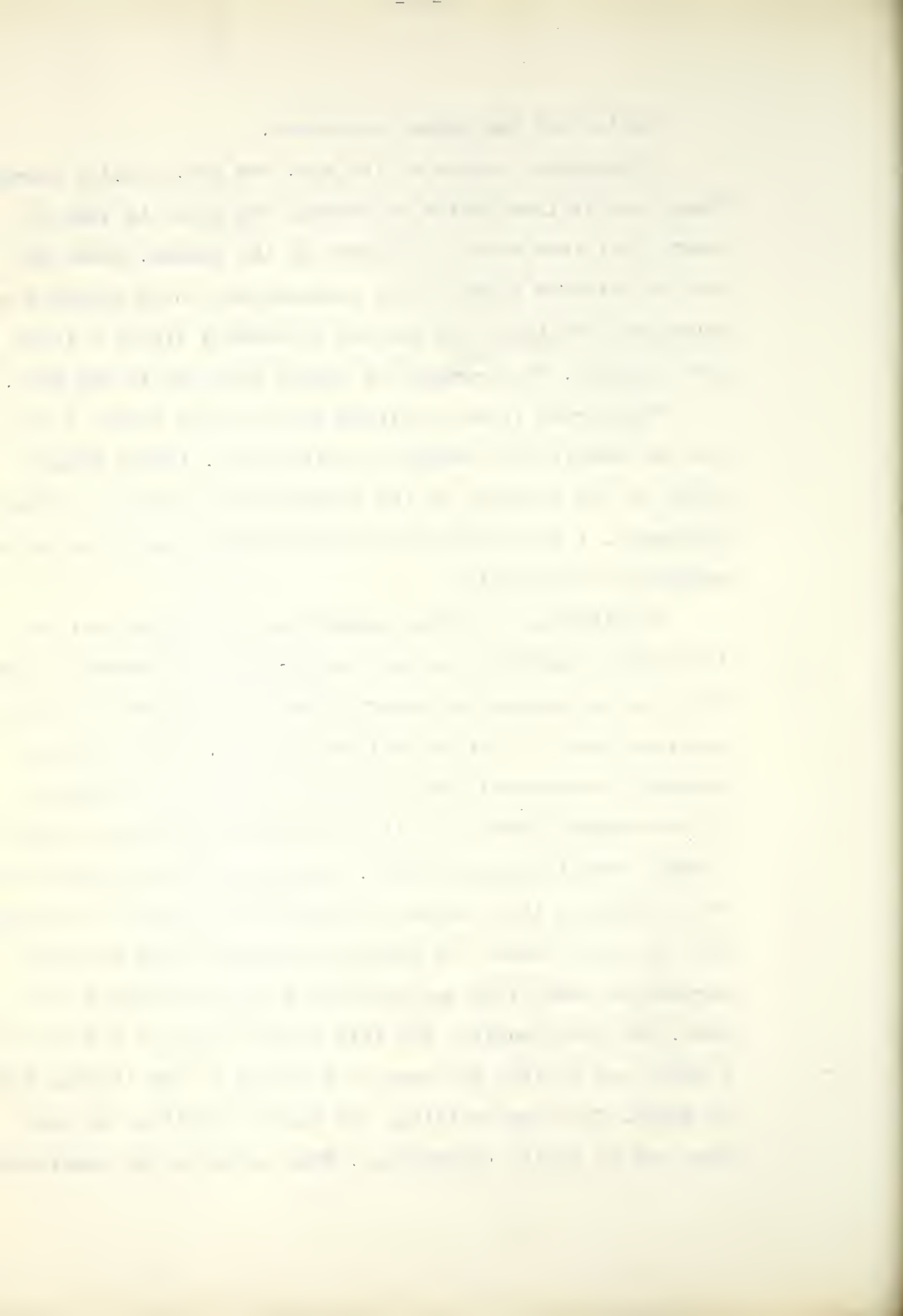


Laying out the Woods Operations.

Estimating is done by the eye. The men, usually George Henry and William Curtis go through the woods to look it over. They then make an estimate on the timber. These men are experienced hands at the business and quite accurate results are obtained. The log run is about 4 1/2 to 5 trees per thousand. The average log ranges from 200 to 225 feet.

The forest is very uniform and for this reason I would use the sample plot method for estimating, taking sample plots in the valleys, on the slopes and on the tops of the mountains. I would know of no other method that would be better adapted to this region.

In planning the woods operation, the things that are taken into consideration are, topography, the maximum tract that can be lumbered successfully with that camp, the best possible route to get the railroad in etc. These are all carefully considered before any active operation begins. If the company finds that it would be practicable to build a camp, work is begun at once. Men are sent in to clear a place of from two to three acres in area. After cleared it is burned over so as to lessen the danger from fire. After this the carpenters come along and start work on the building of a camp. The time required for this work is usually a month or a month and a half. The cost of building a camp is from \$1500 to \$2000. The camp buildings are made in sections so that they can be easily transported. When lumbering is completed



in one place the camp can be removed to another. The native lumber is used for building purposes. Lumbering at Camp # 15 has been carried on for about four years and the company expects to retain it for several more years. In this camp about 15,000,000 is cut annually, making a total cut of 105,000,000 feet in the seven years. In the erection of a camp, the questions considered are- topography, water supply, proximity to active operations, and nearness to the railroad.

The Camp Buildings.

Stable  
Mess house  
Four bunk houses  
Blacksmith shop  
Three store rooms  
Foreman's shack  
Camp boss's shack  
Feeders shack

The buildings are furnished with articles usually found in a well furnished camp.

The Kitchen Outfit.

1. Two stoves
2. 200 tin plates
3. 200 spoons
4. 110 knives and forks
5. 25 syrup cans
6. 8 dish pans and bread pans
7. 200 tin cups
8. 24 small stew pans





10. 24 large stew pans
11. 2 meat pans 2'X 3'X 4"
12. 15 salt boxes
13. 15 pepper boxes
14. 30 small bread pans
15. 24- two quart measures( tea, water and coffee)
16. 3 wash boilers
17. 2 coffee pots
18. 2 preserve kettles
19. 10 bake pans 1 3/4' X 2 1/2' X 3"
20. Cook's outfit, such as meat turners, knives, forks, meat choppers, cake cutters etc.

What is consumed.

1. Meat - 100 pounds per day.
2. Bread- 1 barrel of flour per day.
3. Potatoes- 1 bushel per day.
4. Beans - 2 " " week.
5. Peas - 32 quarts per month.
6. Tea - 3 pounds per day.
7. Turnips - 2 bushels per week.
8. Rice - 15 pounds per month.
9. Apple Sauce - 1/2 - 3/4 bushel per day
10. Raisins - 30 pounds per month.
11. Cabbage - 1 barrel per week.
12. Barley -

THE UNIVERSITY OF CHICAGO

LIBRARY

1900

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1922

- 13. Butter - 40 pounds per week.
- 14. Prunes - 30       "       "       "
- 15. Fish -    30       "       "       "
- 16. Condensed milk - 4 cases per day.
- 17. Lard - 100 pounds per week.
- 18. Oatmeal - 6 pounds per day.

When the Meals are served.

Breakfast ---- 5:00 A.M.

Dinner ----- 11:00 A.M.

Supper ----- 6:00 P.M.

About seventy men carry their dinners. The food for each man costs about 43 cents per day. Each one does his own washing. There is a large trough in which this is done. After washing, the clothes are thrown over limbs of trees or over ropes in order to dry them.

The Camp Store.

The company has three stores, one located at Lincoln and the other ones in the woods. The value of the stock in the camp stores is about \$2400. Both of the stores in the woods are in charge of one man who makes trips from one to the other. All old employees can buy goods and have them charged to their account upon the presentation of their number. All new men can make such purchase only upon requisition from

1890-1891

1891-1892

1892-1893

1893-1894

1894-1895

1895-1896

1896

1897-1898

1898-1899

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1900-1901

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1908-1909

1909-1910

1910-1911

1911-1912

1912-1913

1913-1914

the camp boss or foreman. This requisition states precisely what goods shall be purchased. The <sup>store</sup> is a source of considerable loss to the company. as <sup>men</sup> may come into the camp during the day, procure such an order, make their make their purchase and leave the following night. At the end of each month, the store account of each man is sent into the office and the same is deducted from his monthly pay. The storekeeper is responsible for all goods that are given out without a requisition. He keeps strict account of the man who gives an order because that removes the responsibility from him. The following is a list of articles that are naturally found in a camp store:

| <u>Article</u>     | <u>Price</u> |               |
|--------------------|--------------|---------------|
| Rubbers            | \$2.75       |               |
| Moccians           | 1.75         |               |
| Woodsmen's Shoes   | 5.00 - 5.50  |               |
| Trousers           | 3.00         |               |
| Undershirts        | (Fleece) .50 | (Wool) \$1.00 |
| Underdrawers       | .50          | 1.00          |
| Coats (Skin lined) | 4.00         |               |
| Socks (heavy)      | .50          |               |
| Socks ( ordinary)  | .25          |               |
| Mittens            | .50 - 1.00   |               |
| Pontaes            | 2.25         |               |
| Sweaters           | 1.00 - 5.00  |               |
| Overalls           | .85          |               |
| Shoe Clets         | .15 -.25     |               |





| <u>Article</u>          | <u>Price</u>     |
|-------------------------|------------------|
| Shoe Tacks              | .10              |
| Shirts                  | 1.00             |
| Oiled Coats             | 1.00 - 1.75      |
| Oiled Caps              | .50              |
| Caps                    | .50 - .75        |
| Towels                  | .15 or 2 for .25 |
| Handkerchiefs           | .10              |
| Belts                   | .25              |
| Suspenders              | .25 - .50        |
| Canned Goods as ordered |                  |
| Smoking Tobacco         | .10              |
| Chewing Tobacco         | .10              |
| Matches                 | .05 - .10        |
| Pipes                   | .05 - 5.00       |
| Cigars                  | .05              |
| Soap                    | .10 - .25        |
| Thread                  | .10              |
| Courtplaster            | .05              |
| Glue                    | .05              |
| Tooth Brushes           | .25              |
| Jock Supporters         | .25              |
| Whet Stones             | .05 - .10        |
| Pocket Knives           | 1.15             |
| Cartridges              | .20 - .85        |
| Pencils                 | .05              |
| Ink                     | .05 - .10        |
| Writing Paper           | .25              |



| <u>Article</u>   | <u>Price</u> |
|------------------|--------------|
| Watches          | \$ 1.50      |
| Alarm Clocks     | 1.50         |
|                  | -----        |
| Patent Medicines | .25 - 1.00   |

These prices compare very well with the prices in the town. Articles in general run higher in price in this region than they do in our locality.

The blacksmith shop is equipped a forge, bellows, benches and all tools necessary for the repairing of bob chains and the shoeing of horses. There is one blacksmith who does all of the work.

Every saw requires filing about once in three days. A man can file from ten to twelve saws in a day, entailing a cost of about fifteen to twenty cents for each saw filed.

#### The Camp Crew.

A majority of the men are of a quiet disposition and tend to their own business. The average woodsman of today is very different from what he had been years ago. The wages paid are such that will not satisfy old woodsmen and for this reason, the crew is usually composed of young, inexperienced men who think that the life in the woods is





is an easy one. They soon change their opinion in regard to this matter and as a result, they soon leave. Men are coming and going every day. All who come can obtain work because there is a scarcity of labor.

The average salaries range from \$25.00 to \$50.00 per month not including board which amounts to about 50 cents per day. The foreman, Mr Curtis receives a salary of \$115 per month and board. Mr. Curtis travels around the different camps and sees that all operations are proceeding in the right direction. Mr. Boyle, the camp boss, receives \$60 per month and board. He has charge of the camp and takes care of the daily reports.

The cook leads the least desirable life of them all. He is busy from three o'clock in the morning until ten o'clock at night. His salary is \$55.00 per month and board. He has two assistants who receive \$26.00 and \$28.00 per month inclusive of board.

There is a scaler at each landing who scales the logs and determines their cubic content. Their salary is \$2.00 per day.

The bookkeeper, Mr Fogg, travels around to the different camps, collects the daily reports and enters them upon the books in the office.

#### The Stable.

The stables ~~are situated~~ are situated on the other side of the track opposite to the bunk houses. They are located



in a low place, a condition which makes the sanitary conditions rather poor. The first floor is divided into three parts, two rows of stalls and a span between them where the food is made ready for distribution. Each row of stalls accomodates sixteen horses. The second floor is used as a storage place for the food.

The teamsters are required to take care of their teams. Each outfit consists of two buckets, a comb and brush, and two halters. Blankets are used only on the horses next to the doors.

Each horse gets eighteen quarts of oats and about sixteen pounds of hay per day making the cost of the daily ration about thirty-nine cents. The horses are Canadian bred, of medium size, and coat from \$150 to \$200 each.

#### The Woods Operations.

Felling. In this process, three men are required. The first and second choppers cut down the tree while the third one does the trimming. The third chopper is usually a new, inexperienced man who is unable to do anything else. The trees are felled both by the ax and by the ax and saw. When trees are small, the saw is not used. In this case the two men stand opposite each other and chop at the same time. It requires but a very short time to fell a tree. When trees are very large, a notch is cut and the saw is then brought into use. The third chopper then takes charge of the fallen tree.



He trims off the branches and then cuts off the top at a diameter not exceeding four inches.

The ax which is of the double bit type has a straight and narrow edge. It is of stocky construction and with the heavy iron wedge it is very well suited for this kind of work. The saw is like the average saw used in any lumbering region. Wooden wedges are used when the saw pinches.

Care is shown in regard to the height of the stump. It is seldom over twelve inches in height. Trees are cut down without any regard to the destruction of the species.

A crew can cut from 10,000 to 12,000 feet per day. The earnings of the crew are about \$6.50 per day making a cost of from 55 to 65 cents for each thousand feet of timber cut.

There is very little timber left in the woods. About 90 or 95% of the timber is taken out of the woods. One of these crews can cut over four acres in a week.

No swamping is done where the teamster can get to them. A log chain is put around a log and then it is pulled out to the road where it is put on bobs.

#### Hauling.

In getting the logs from the woods to the landing, the logs are chained to a bob which is drawn by horses. In this operation one end of the log is put up on the saddle of the bob and chained while the other end is left dragging on the





on the ground. Two horses are generally required but when they are very light, two teams are required. In this operation, two men constitute the crew, the teamster and the bob tender. These men are very expert in their work and are able to put a load upon the bob in about thirty minutes. The equipment used is a bob, chains to tie the logs on the bob, two peabes, a long chain to get the logs to the road and an ax. About 1500 feet can be hauled on one load. With one team, four to six trips are made daily carrying a total of from 6,000 to 9,000 feet of lumber a distance of a mile or more. The cost of hauling is about 55 to 85 cents per thousand feet.

The roads are built with great care so that the maximum load can be drawn with the least amount of power. There are no steep grades in the road if there is any possible way to avoid them. The roads are in practically the same condition as are ordinary country roads. The roads are "skidded" that is, small poles are laid across them so as to decrease the amount of friction.

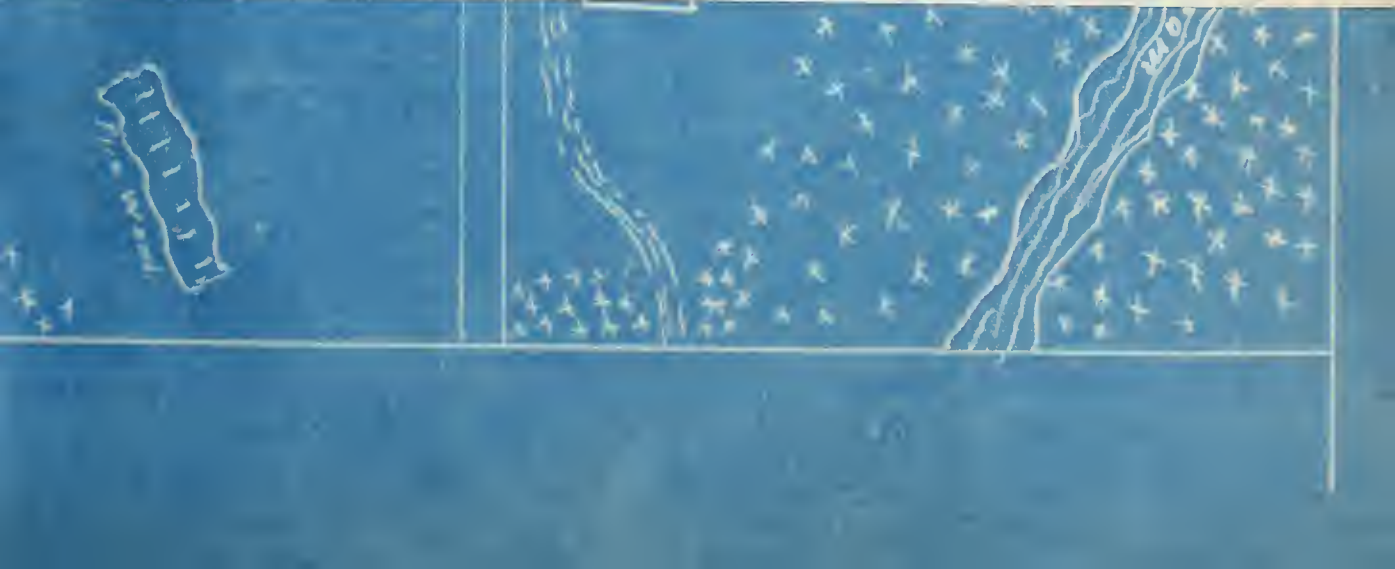
The roads are kept in good condition. Men are working upon them all the time. The company estimates that the cost of building and repairing the roads is about 50 cents for every thousand feet of timber. The roads are divided into two classes, the main roads which lead up to the landings and the branch roads which lead from the regions where the trees are felled to where they join the main roads. These branch roads are made as the choppers advance. They are rudely constructed and in many cases they are almost impracticable.



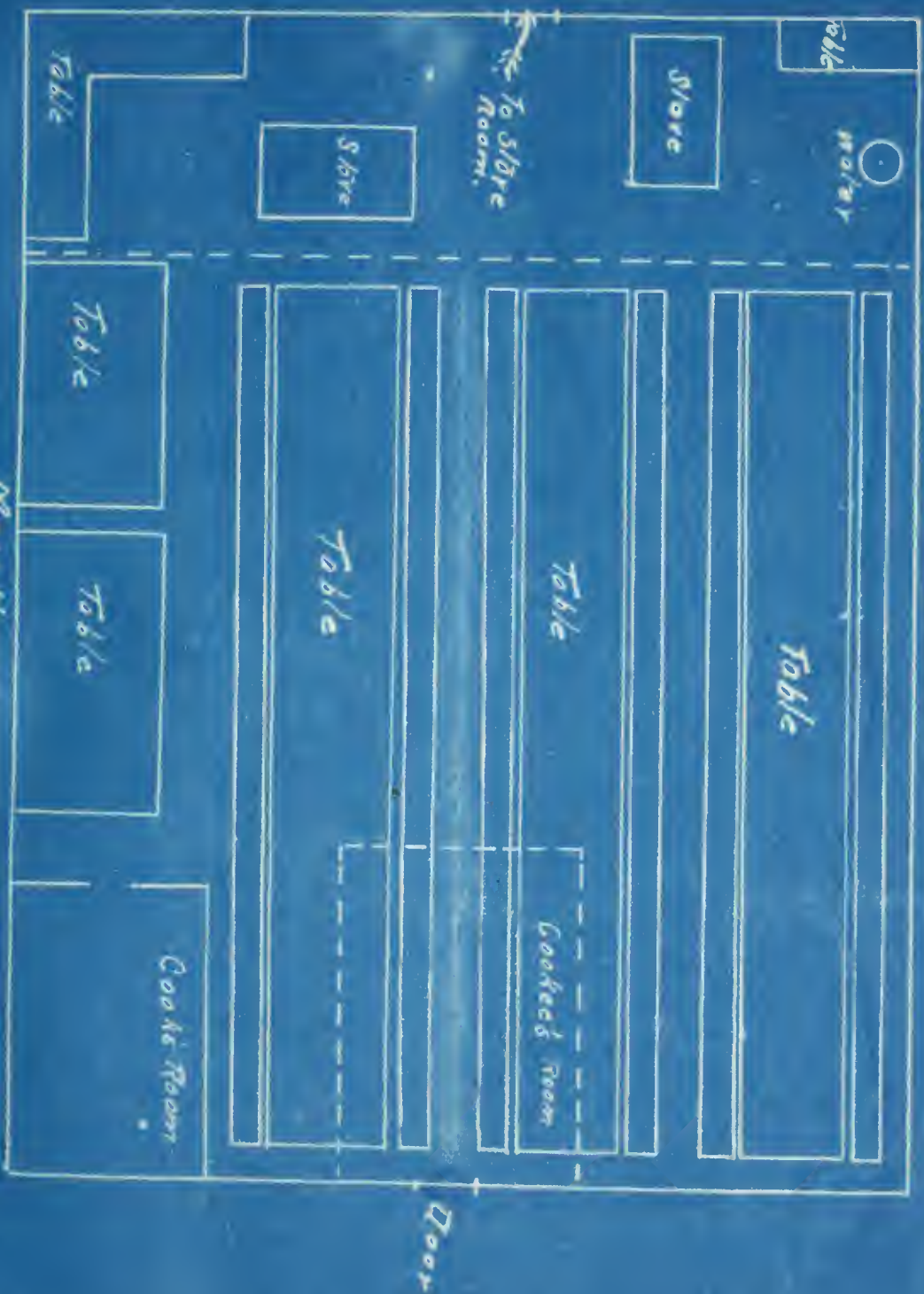












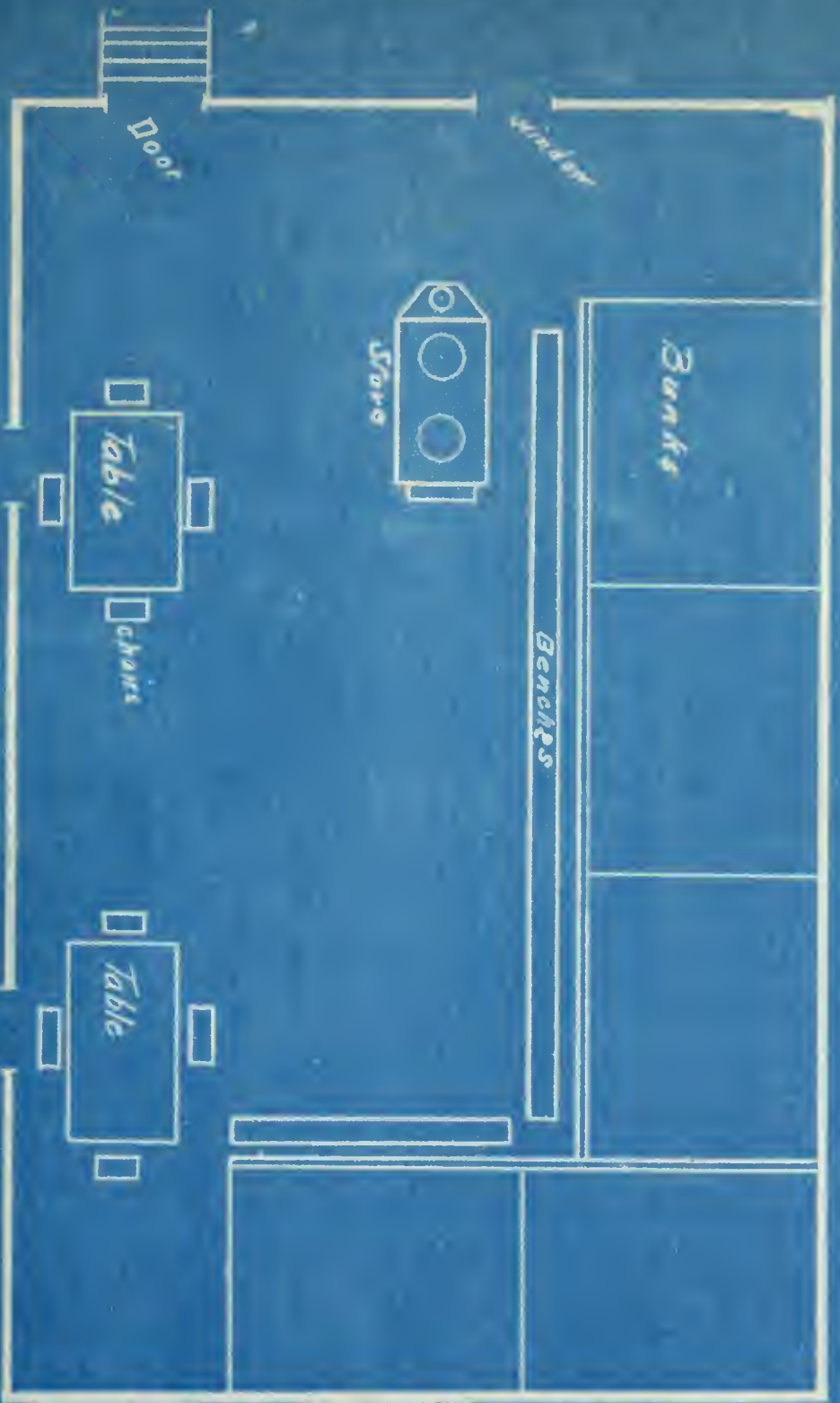
Mess House  
Camp 15

W.E. Henry & Sons Co  
Lincoln  
N.H.

1914







Bunk House  
Camp 16

McHenry & Sons Co.

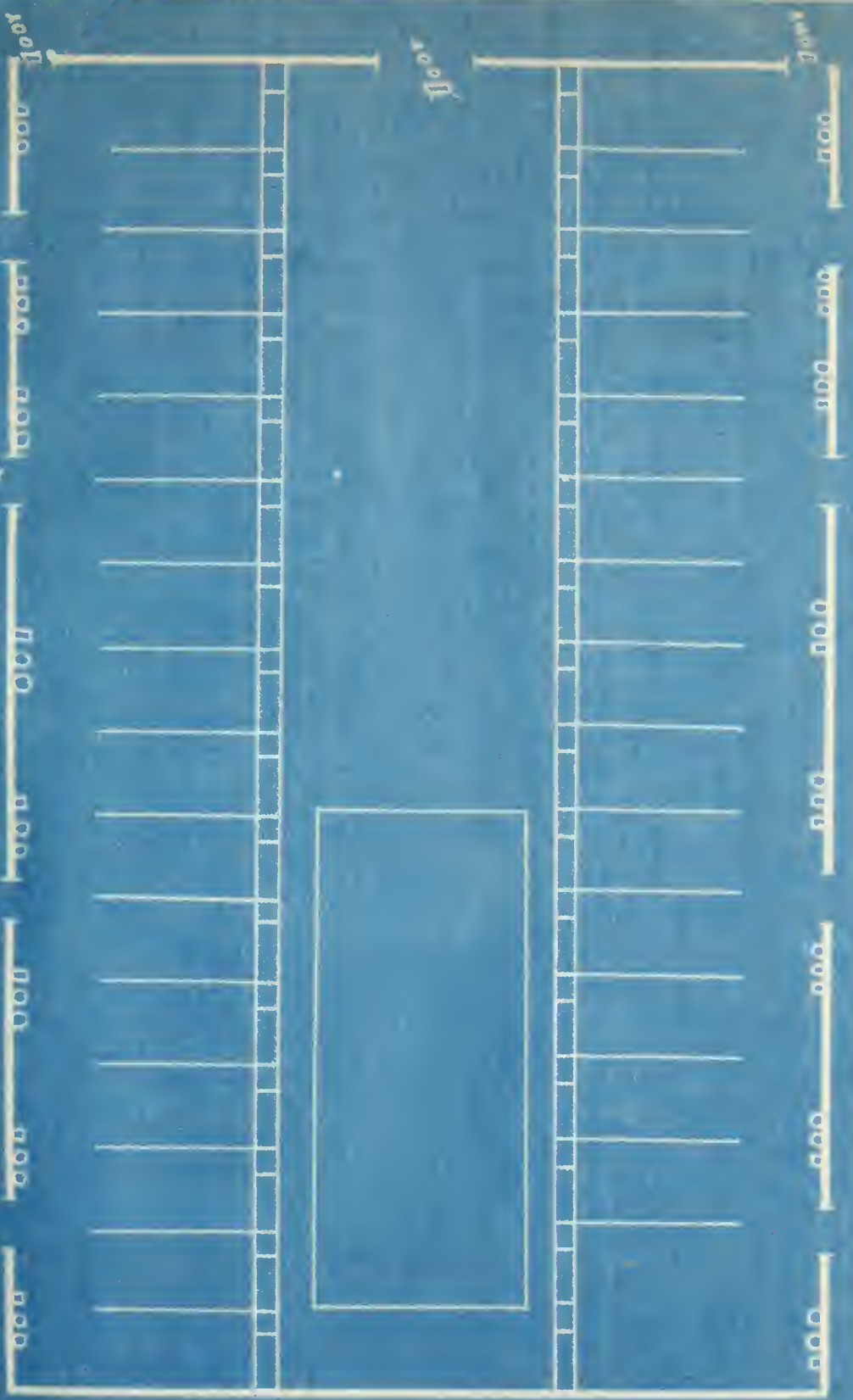
Lincoln

N.H.

1901







Stable  
Camp 15

St. Henry & Sons Co  
Lincoln  
N.H.

Ingram



# FOREMAN'S REPORT.

Camp No. 16. Jan. 5

1907

| Name of Teamster    | Team No. | Men   | Horses | ft. | Mill Logs | ft. | Pulp Logs | Culls | Trips | Remarks      |
|---------------------|----------|-------|--------|-----|-----------|-----|-----------|-------|-------|--------------|
| Team - rem. Camp 15 |          | 2     | 2      | 150 |           |     |           |       |       | Party Jan.   |
| Building roads      |          | 2 1/2 |        |     |           |     |           |       |       | Jan 6. Party |
| Team Camp 15        |          | 2     | 2      | 300 |           |     |           |       |       |              |
| Roads               |          | 1 1/2 |        |     |           |     |           |       |       | Jan 7.       |
| Cutting ice         |          | 2     |        |     |           |     |           |       |       |              |
| Team from Camp 15   |          | 1     | 2      | 300 |           |     |           |       |       |              |
| Roads               |          |       |        |     |           |     |           |       |       | Jan 6.       |
| Cutting ice         |          | 2 3/4 |        |     |           |     |           |       |       |              |

William H. Curtis

FOREMAN





# LOGS

Shipped from Camp

190

| No. of Cars | MILL LOGS |      | PULP LOGS |      |
|-------------|-----------|------|-----------|------|
|             | Logs      | Feet | Logs      | Feet |

Jan 22 1909  
Marshal. Gallant

Worked 26 days in December

Worked \_\_\_\_\_ days in \_\_\_\_\_

Boarded at No. 15 Camp 3 days

Boarded at No. \_\_\_\_\_ Camp \_\_\_\_\_ days

Cr. \$ 48.10

Charge 15.50

Mr. William H. Curtis FOREMAN

Total time month of Dec. 26 days

H. W. Dugg TIME-KEEPER

Dr. to goods at No. 3 Store, \$ 3.10

R. M. Kearey STORE-KEEPER

Settle at \$ 29.50  
100

G. E. Henry SUPT.

THIS BILL will not be honored at the office unless signed by Foreman, Store-keeper, Time-keeper and Supt.

Scaler



CAMP 151

Jan 15 1909

J. E. Henry & Sons Co.

Lincoln, N. H.

Please settle with me next

Pay Day, as follows:--

Cash in full.

75.00

Cash on account \$ 225.00

Due-bill for balance.

J. E. Henry

Check No. 2525

| Days             | Month | Wages | Amount |    |
|------------------|-------|-------|--------|----|
| 25               | Jan   |       | 100    | —  |
| 1st              | Feb   |       | 22     | 78 |
|                  |       |       | 22     | 78 |
| CHARGES          |       |       |        |    |
| Rent             |       |       |        |    |
| Board            |       |       |        |    |
| Hospital         |       | 50    |        |    |
| Merchandise      |       | 325   |        |    |
| Cash             |       |       |        |    |
| Miscellaneous    |       |       |        |    |
| Balance          | 319   | 03    | 22     | 78 |
| Balance Enclosed |       |       |        |    |

Keep this for reference. Examine the above account carefully before making claim for error or shortage.

J. E. HENRY & SONS Co.











Mr. Curtis on his "Bike". These "Bikes" are used by all the men whose business requires them to visit the different camps, such men as the book-keeper, the foreman, and etc.



This shows the bob that is used by the company in getting the logs from the woods to the landing.





Log landing at Camp #15. The logs at the landing are separated into three classes:- Long logs, logs for pulp wood, and mixed logs. From 60,000 to 85,000 Bd. Ft. are loaded at this landing daily.



Landing at close range, showing the type of logging car used in the White Mt. lumber regions. These cars average about 6,000 Bd. Ft. per load, and can be made longer or shorter, as required, by means of a beam connecting the trucks.







Main road to the landing. These roads are carefully laid out in order that maximum sized loads may be hauled with a minimum number of horses. All steep are carefully avoided, and sharp curves are steered clear of.



Trail from Camp #15 to the landing. This trail is used by both men and horses in going to and from their work; it is a short cut, and is not used in hauling the logs.





View showing the method of putting the logs on the bob. These men are very expert at their work, and can load a load of from 1200 to 1500 Bd. Ft. in twenty to thirty minutes.



Bob used in transporting the logs from the wood to the landing. The method of holding the logs in position by means of chains is shown here, and from two to four horses are used in hauling such a load from the choppings.







A white pine, 6'3" in diameter. This tree is the only white pine in the immediate vicinity, all the rest being black spruce the tree is about 145 Ft. high, with a clear bole of 65 Ft. In comparison with this, the other trees look very small.







This view shows the waste attendant upon the lumbering methods used by the J.E. Henry & Sons Co. The tops above the four inch diameter point are left on the ground, and add to the danger from forest fires.



This photograph shows practically the same things as the above. The cuttings are made clean as they advance, and these views show where the lumbered and uncut portions meet.





The above view shows the effects of fire, caused by leaving the slashings scattered about. Considerable damage has been done by fires. About 10,000 acres has been burned in the last few years.

n



This is another view showing the effects of fire. It also shows the granite rocks which are so prominent in this.







Average stand of lowland forest type. Black spruce, white pine, balsam fir, paper birch, gray birch, etc., grow in intimate mixture, and average about 15,000 Bd. Ft. per acre.



Average stand along the Mt. slopes. The coniferous species form a preponderance of the stands at the higher altitudes, and the average stand, all species combined, is about 14,000 to 16,000 Bd. Ft. per acre. The maximum stand is about 20,000.





View showing topography of country about Camp 15. These mountains were lumbered by the J.E.Henry and Sons Co., about four years ago, and the condition in which the country is left by the clear cutting system employed by this company is clearly shown here.



The same territory from another point of view. The fallen trees in the foreground show the effects of the periodically recurring forest fires.







Photograph taken from the landing at Camp #16. The mess-house, storage house, and shacks of the feeder and camp foreman are pictured. This is one of the camps which will be opened in the near future.



A distant view of Camp 15, showing the relations of the various buildings to one another and their proximity to the railroad. These buildings are built in sections so as to be transportable.







View of Camp #5 of the J. E. Henry and Sons Co. This is one of the eight camps owned by the company at the present time. Of these camps three are now in operation, while preparations are being made to open two more in the future. All of the camps are connected with Lincoln by a company railroad which runs two trains daily.



Interior view of the mess-house of Camp #15, showing arrangement of tables, etc. One cook and two cookees are required in this camp to prepare the food for the men employed. Seating capacity is for about one hundred men.





This is a photograph of Mr. William H. Curtis, the foreman of the woods operations of the J. E. Henry & Sons Co. Mr. Curtis has been with this company for the passed eight years. He has charge of the work carried on in the woods. He is very efficient and thorough in his work, and is relied upon by the company to perform such duties as making estimates, reports on lands to be bought, and plans of future work. Mr. Curtis is native of Nova Scotia and is thirty three years old.





Reports.

The different camp bosses prepared the records of the daily work and these are collected by the bookkeeper. These the latter enters upon the books and at the end of each month, he sends in a report or statement of accounts to the main office. This statement contains, (1) the supplies that were delivered to the camp; (2) the total number of days worked; (3) the number of men that worked; (4) how long each man worked; (5) scale reports showing how much timber was cut. The camp storekeepers send in their reports of the goods sold and given out to the men. With these and other reports, the company has accurate information as to how much each operation costs them.

1894

The following table shows the results of the  
experiments conducted at the Agricultural  
Experiment Station, during the year 1894.  
The experiments were conducted under the  
direction of the Agricultural Experiment  
Station, and the results were published  
in the report of the Agricultural  
Experiment Station, for the year 1894.  
The results of the experiments were  
published in the report of the  
Agricultural Experiment Station,  
for the year 1894.

mill so as to place a check on the scaler's figures. The cost of scaling is about 5 cents per thousand. About 60,000 are scaled in a day.

### Railroads.

The company owns about twenty miles of railroad which connect the different camps with the manufacturing plant. The road is of standart gauge and is very well constructed in every detail. Many trestles and bridges span the streams and low places. The cost of grading the road was about \$6,000 per mile. This together with an additional \$3,000 covers all other cost of construction. The ties used were obtained from the tract, all kinds of timber being used for this purpose. The cost of the rails was \$32 per ton. The logs are transported twice each day. Each train consists of from fourteen to eighteen cars carrying a total of 90,000 feet. The company estimates that the cost of repairs aggregates \$20.00 to \$ 25.00 per day. There are in use one hundred and fifty trucks, four engines, three cabins besides what cars are used which belong to other companies. The train crew consists of an engineer, fireman, conductor and two brakemen.



### The Skidway.

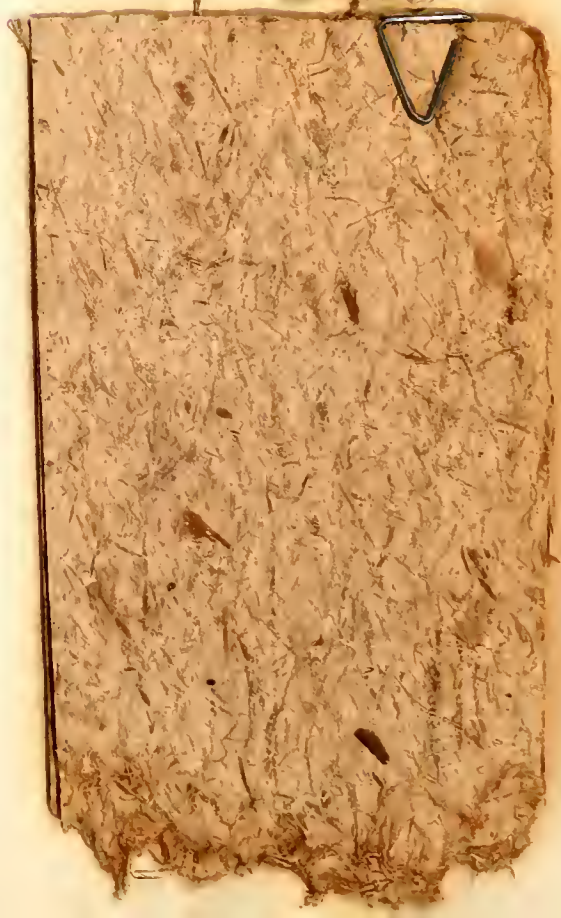
The skidway is so located that the haul from the different points of the area will be practically equal. It is located in the valleys and in easy access to the main railroads so that a branch can be run in. The skidway is so placed that the logs are placed on the train in the easiest possible manner. It is impossible to estimate how many logs are on the skidway but there are always enough to keep the loader busy. There are six men employed on the skidway in putting the logs on the cars. The men become very expert in this work and the logs are loaded rapidly. From 60,000 to 80,000 board feet are daily loaded upon the cars at camp # 15.

When the logs come to the landing, they are scaled and sorted to be placed on one of the three divisions of the skid way. The regular crew consists of three men, two of which load the logs upon the cars and a third who keeps the logs moving toward the first two men. These men receive \$2.00 per day not including board. The cost of loading the logs on the cars is about 15 or 20 cents per thousand feet.

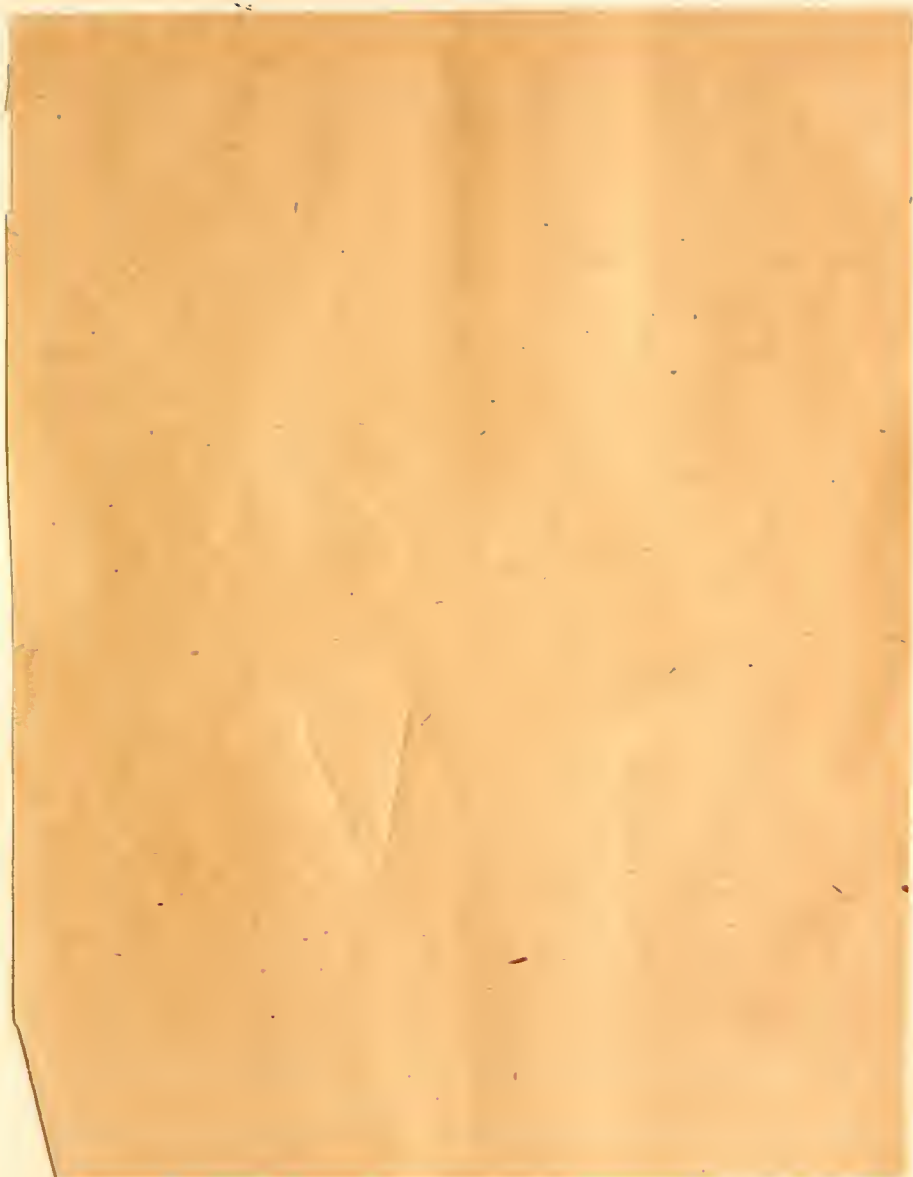
Scaling. There is one scaler to each landing who is kept busy all the time. He calipers the logs at the middle and finds their cubic content. They estimate 115 cubic feet of timber for each thousand feet, making allowance for defections, tapering etc. The logs are again scaled at the



















## Report of The Santa Clara Operation

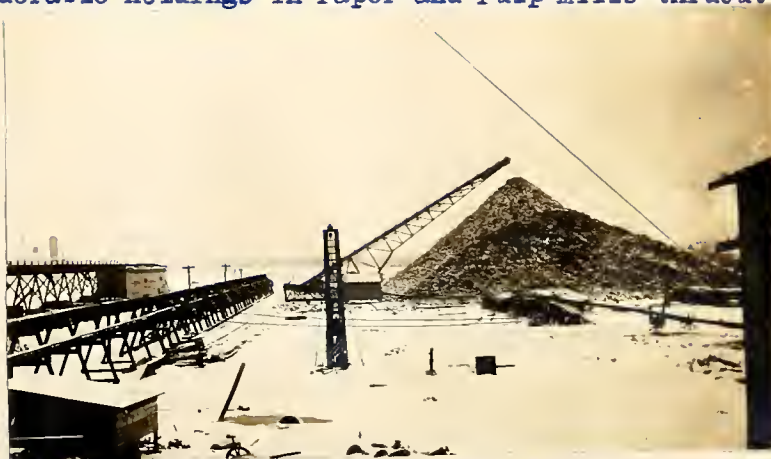
### Seward Brook Camp Number 2

The Santa Clara Lumber Company is an old company cutting lumber chiefly in the Adirondack region of Northern New York. Recently they added to their holdings a large tract in Ontario County known as the Cornwall property. This company is the heaviest logging concern in the section where it operates, its annual cut being approximately 30,000,000 board feet annually, one half of which comes from its own holdings. The Santa Clara Company uses the drive as a means of transportation to the mill, relying on snow to get the logs to the landing. The cuttings are confined chiefly to Spruce altho the other prevailing species such as Fir, Cedar and Hemlock are sometimes taken out. Provisions are made for reproducing the stand in most cases.

In caring for this problem the company designates a diameter limit to which the timber is to be cut, but it is not closely adhered to. Further than this the company established means of supplying artificial reproduction making it unnecessary to rely entirely on the provisions of nature for a future stand. In 1906 a company nursery was founded sufficiently large to grow all the seedlings they were able to grow at that time. This nursery consisted of sixteen seed beds, in which were grown White Pine Scotch Pine, Norway Spruce and Red Spruce. The ensuing year the seed bed area was increased one hundred percent and Bull Pine was added to the species. Still later, in 1908 the total number of the seed beds was increased to fifty. The spring of the same year all the two year old seedlings with the exception of White Pine were set out. Twenty-five thousand were planted out directly. In the spring of 1909 fifty thousand seedlings were transplanted. The next year sixty thousand were set out. In 1911 two plantings were made totalling sixty thousand seedlings. Two plantings were also made in 1912; one of 38000, and one of 63,000. The species were as follows: White Pine 38,000 Norway Spruce 50,000, Bull Pine 20,000. Ten thousand White Pine seedlings were disposed of in 1913, bringing \$2.00 per thousand. Fifty-five thousand Norway Spruce seedlings were also shipped to the University of Syracuse, for which they received value equal to \$1.50 per thousand. The remuneration was made in terms of seedlings and transplants at various times. The same year the nursery was enlarged by twenty additional seed beds, and 41,000 seedlings were transplanted. As a result of this nursery practice practically all the barren or burned over areas in the section have been planted up and the company feels that their money is profitably invested.

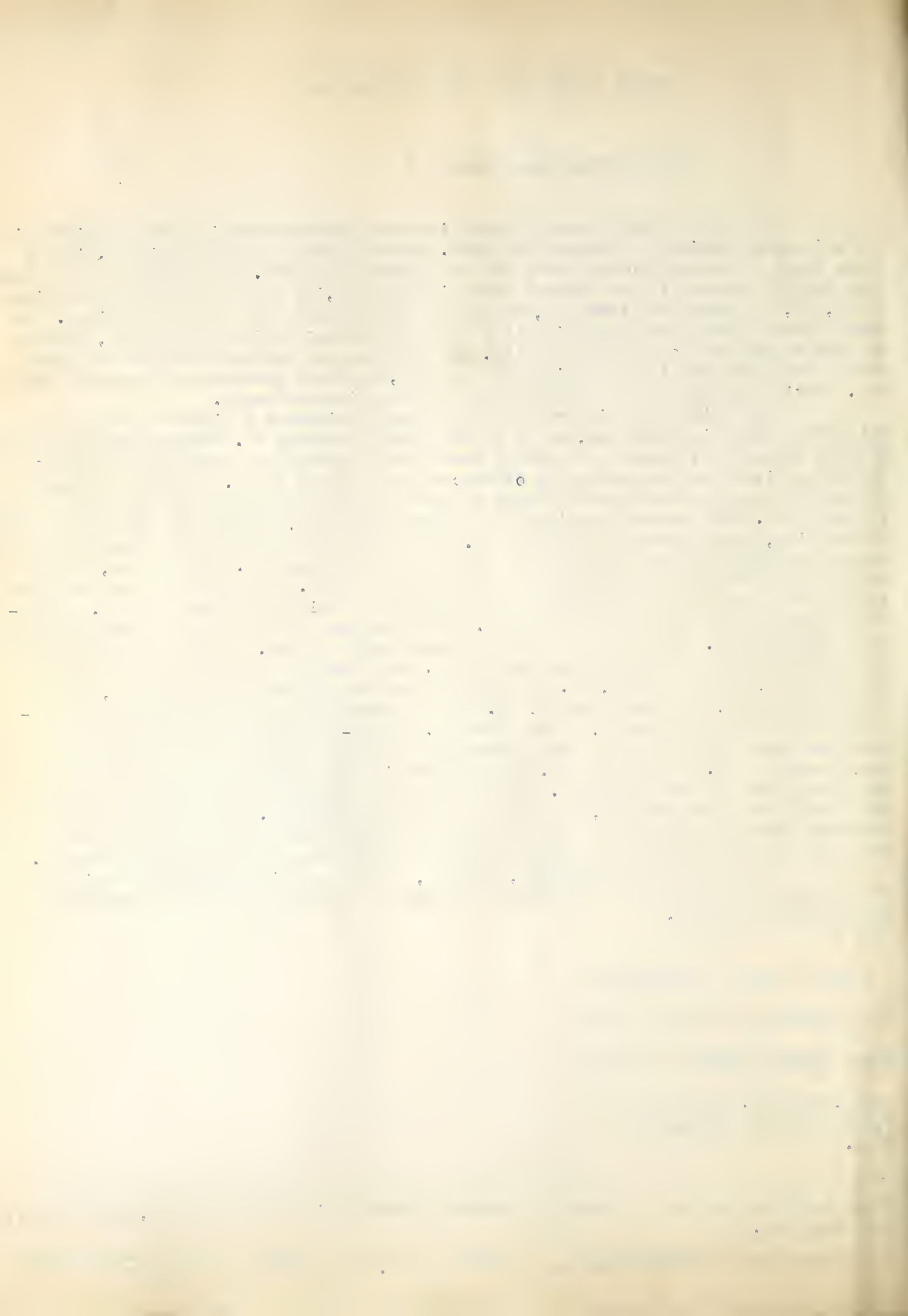
The Santa Clara Company, however, is not only interested in logging propositions but also has considerable holdings in Paper and Pulp Mills thruout the Eastern United States.

Apile of cord in storage at the Norwood Mill of the Santa Clara Lumber Company at Tupper Lake, New York. Approximately 3,000 cords in the larger pile.



These holdings consist of stock in concerns operating in West Virginia, Pennsylvania, and New York.

In the company mill at Tupper Lake wood for paper pulp is manufactured and transported directly to mills in the vicinity. The bolts are cut and rossed in





the mill and shipped in this form.

Santa Clara Lumber Company's

lumber and pulpwood mill at

Tupper Lake, New York. The picture shows the gang saw.



Altho the company is large and has considerable holdings the organization is comparatively simple. The fundamental principle lies in the belief that too complicated a system does not prove efficient. Consequently the following organization has been adopted :-

I Stock Holders

A. Board of Directors.

1 President.

a. Vice-president.

b. Secretary.

x. Corporation matters.

c. Treasurer.

x. New York books

y. Tupper Lake books

z. Bank accounts, collections and securities.

d. General Manager,

x. Superintendent at Tupper Lake,

a'. Assistant Superintendent. \*

b'. Taxes.

c'. Tupper Lake Office Force.

d'. Woods Superintendent.

1'. Camp Foreman

o. Lumber Jacks.

e. Real Estate. 2' Superintendent of Teams.

o. Horsemen.

1''. Feed Mill

2''. Horses

3''. Barn Boss.

y. Real Estate.

\* a'. Assistant Superintendent.

1'. Department of Purchasing and Supplies.

2'. Yard.

3'. Toting.

4'. Camp Clerks.

5'. Shipping.

a''. Loading.

6'. Engineers .

a''. Firemen.

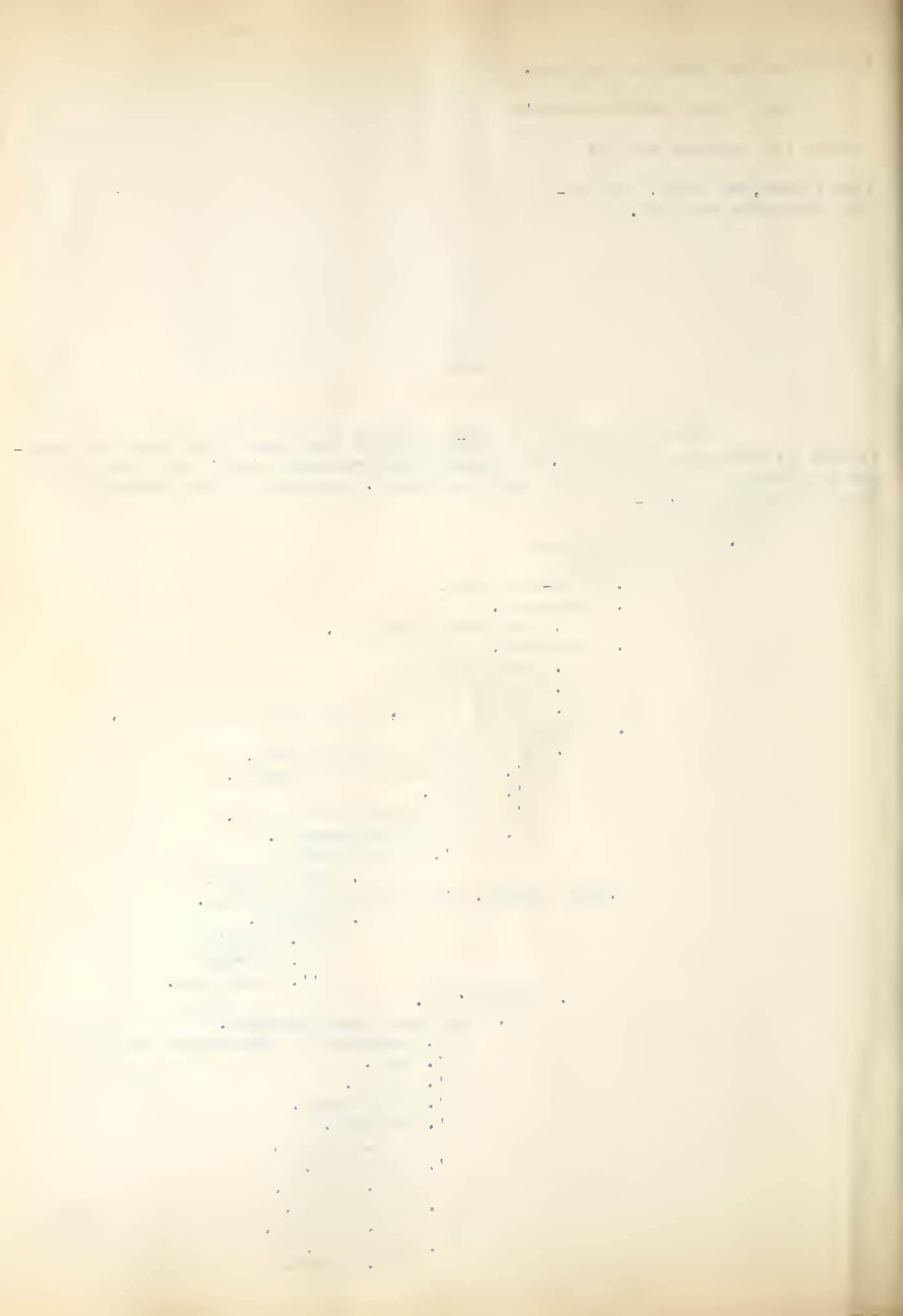
7'. Pond Foreman.

a''. Laborers.

8'. Woods Room.

a''. Foreman.





- 1". Rosser Men.
- 2". Laborers.
- 9'. Shops.
  - a". Blacksmith.
  - 1". Helpers.

### Operation.

Of the initial investment of this operation little could be learned definitely. Access to the itemized accounts referring to the yearly taxes and insurance could not be gained. The only available information concerning the operation that could be collected was secured from the employees who seemed to have no accurate knowledge of the expenses other than those of the woods and of the operation proper.

The tract supplying the logs for the mill operating at Tupper Lake is operated by three main camps and a tote camp designated as Headquarters. This latter or Headquarters, is the base of supplies for the outlying camps and the residence of the clerk for the whole operation. The orders for supplies are managed entirely from headquarters. Orders are sent in by telephone and the required commodities are delivered by tote teams, of which there are three.

The clerk at this camp registers all accounts; and gives checks for all outgoing labor, after deducting the amounts of all debts which may have been contracted by said labor while in the woods. These checks are honored at the Company Offices. Further than this, he keeps all the accounts of the outlying camps, balancing them each month. The salary of the clerk was not to be secured.

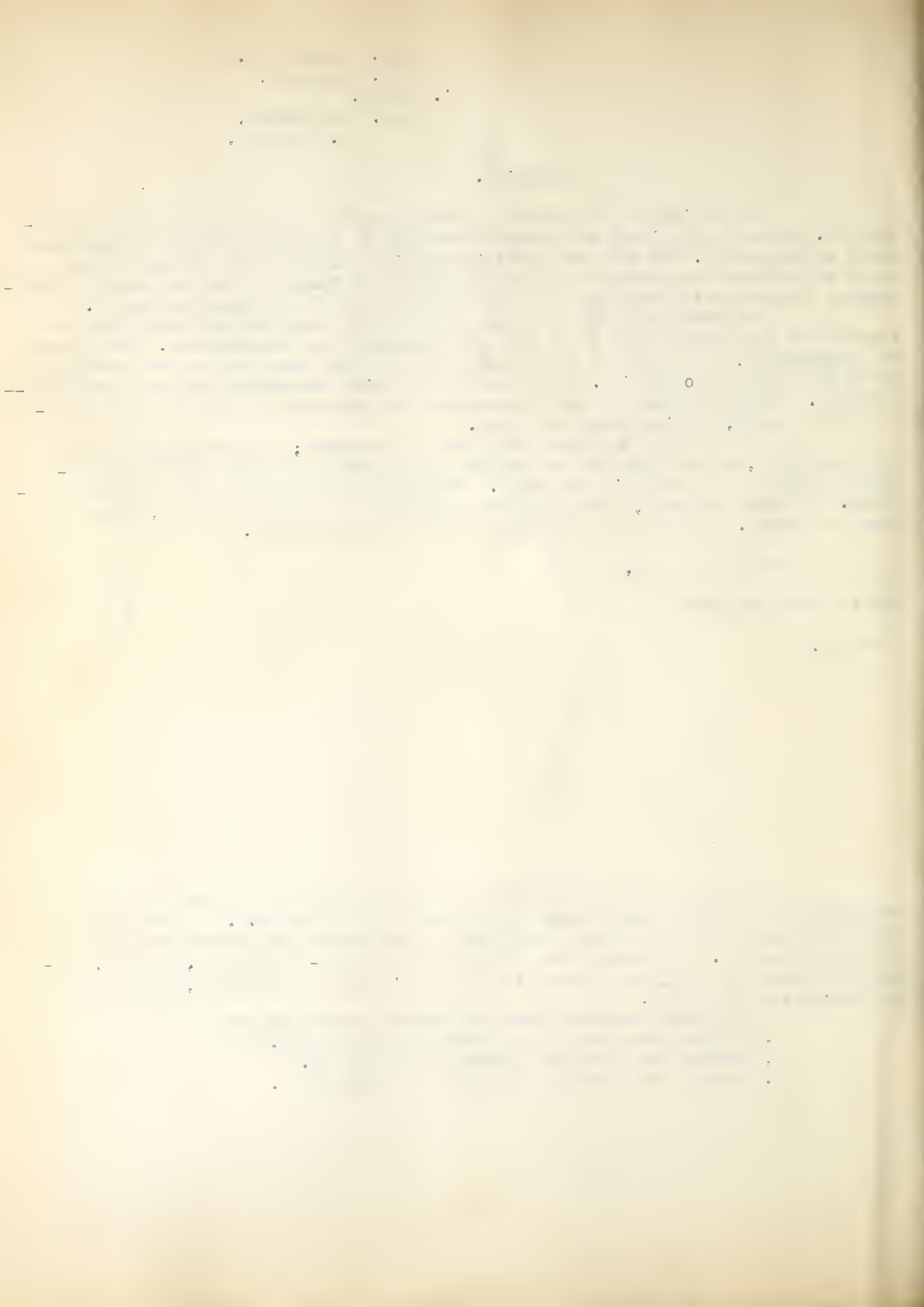
Loaded Tote Team,  
showing sled and method of  
loading.



These headquarters consist of the rejuvenated buildings of the first camp which the Santa Clara Company established in this section. The buildings have been transformed and changed considerably; the present bunk house having been the former stables etc. At present the buildings in use are:- bunk house, stables, dismantled blacksmith shop, cook shack with the cook's quarters attached, supply house and quarters of the clerk.

The camps operating from headquarters are as follows:

1. Boulder Brook Camp at a distance of four miles.
2. Preston Pond Camp at a distance of six miles.
3. Seward Brook Camp at a distance of seven miles.



Boulder Brook Camp.



Skidways at Boulder Brook Camp showing the method of piling the logs on the skids, a twosled road, and in the foreground a wooden horse.



Close view of the wooden horse showing the sharp runners and the means of steering.







Wooden horse and two-sled ready to descend the hill. The picture shows the method of attaching the wooden horse to the tongue of the sled.

Boulder Brook Camp.



A brake composed of two drums capable of being locked. This contrivance makes it possible to draw an empty sled back up the grade by means of the weight of the loaded downgoing sled.

Boulder Brook Camp.



Seward Brook Camp Number 2.

This camp is a one storied camp of typical Adirondack character. It was established eight years ago and has obtained the unusual record of having been in constant operation since that time. The shacks are shingled with Spruce Bark shingles which make a very good and durable roof. More air space is secured also, this eliminates to some extent the vermin which usually collects under paper roofing. In

Seward Brook Camp No. 2.

The picture shows to some extent the arrangement of the various buildings.







the construction of this sort of camp the work generally begins about the latter part of June or the first of July requiring approximately twenty-five men ,two teams a foreman and a cook for a period of two weeks;the cost usually averages between \$6.00 and \$7.00.

the camp buildings consist of an office and store combined, a bunk-house to accomodate sixty men,cook shack with an underground store house combined, stables, blacksmith shop,storehouse,foreman's shack and two latrines.

(Diagrams and floor plans are attached on a separate sheet.)

The Bunk-house at Seward Brook Camp Number 2, showing the three tiers of bunks, deacon benches and one of the two windows: the only source of light.



An example of the year's schedule of work may be taken from the operation in the Winter of 1915--1916. The camp was opened the latter part of July. For a few days more than a week the time was spent in making the necessary improvements on the camp, rejuvenating the old and building new roads. Ten men were kept busy thruout this period chopping the winter supply of fire wood.

About August 7 sawing was started. Skidding was done at the same time. The felling and skidding crews on this operation consist of seven men each, namely;

- One chopper
- two sawyers
- one lopper
- two guttermen or swampers
- one roller and teamster

The New York State Law requires that all tops be lopped. This necessitates an extra man on the crew.

Skidding was over December 28, 1915. Bobbing and hauling then began. On this operation the front sled of a twosled is used for a bob; these makesix trips daily. ( Diagram of a twosled is attached.

The mian twosled road to  
the landing . Seward Brook Camp

Number 2







The roads used for bobbing are not so carefully made as those used for the main two-sled roads. On the latter road monkeys are kept constantly, at various intervals, to care for the roads and apply dirt where needed to increase the friction. The main roads are first leveled, usually in the summer or late fall. After the first snow, if it be heavy, the roads are plowed with a snowplow. (A diagram of this apparatus is attached on a separate sheet.) After this an empty two-sled is run over to cut out the tracks. Numerous sleds are then dragged over the road; the successive loads being increased gradually until the snow is well packed and well defined ruts have been formed. From this time on until the next snow the constant hauling is sufficient with a little care from the road monkeys, to keep the roads in fairly good condition.

Two-sleds are used to transport the logs on the lesser grades. These

Road monkey's lean-to of  
boughs, also houses a Barreinger  
Brake.

Seward Brook Camp No. 2.



two-sleds average three and one half trips daily, to the landing, a distance of two and one half miles. The empty sleds are hauled back over back roads not so well cared for and not so good as the main roads. The speed of the sleds is controlled by Barreinger Brakes, on the steeper grades. Seward Brook camp has two of these brakes each of four wheel-brakes. From the brakes  $3/4$  inch cables are attached to the rear sled of the two-sled. (Boulder Brook Camp attached the cable by running it entirely around the load of logs. Four teams were engaged in hauling while ten teams were bobbing.

Barreinger Brake.

The four brake wheels and  
the controlling levers are plainly  
shown, also a dragging cable



The logs are loaded from the skids to the sleds by hand with the use of peevies, cant hooks, grabs, and inclined skids; sometimes a crosshaul is used for extremely heavy logs. When the load becomes two or three logs high, chains are thrown over and hooked. Other logs are then piled on pressing down on the chain and consequently





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it becomes taut making a solid base for the load. As the height of the load increases skids are brot into use, the logs being rolled up these to the load. Whenn the sled is completely loaded the load is fastened on with toggle chains thrown over the load and hitched.



Loaded Twosled; showing the method of binding the logs on.

The small pole which is shown twisting the chain is used as a means of tightening. the upper chain or the last one to be put on the load.

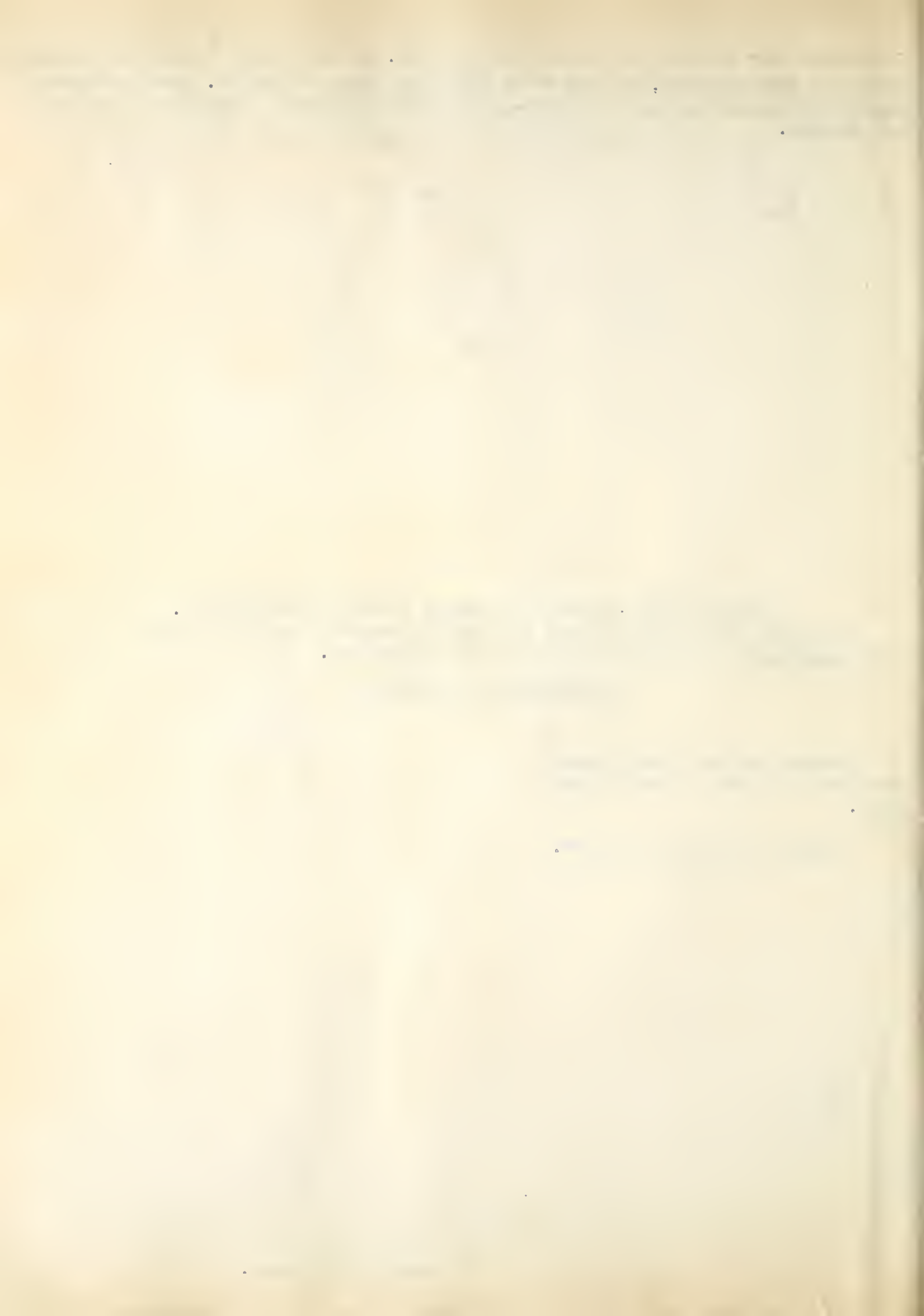
Seward Brook Camp Number 2

Loading logs with cant hooks the logs are being lifted to the sled.

Seward Brook Camp Number "2."



Loading with skids.





At the landing the loaded two sleds are drawn up to the landing-  
the loads are released by knocking loose the toggle chains. The logs

Drawing load of logs up  
to the landing



Releasing a load  
of logs



After the load  
of logs is released



are then rolled over skids into place by men with both peevies and cant-  
hooks. Short handled canthooks are prevalent. Four to five layers of logs  
are made in the stream bed, parallel to the stream banks, making the  
piles about seven feet high.





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# Method of piling logs on the landing

Unloading the logs  
and rolling on the  
skidways



Rolling the logs out  
on the landing



Above the landing, a splash dam was built to control the drive at the time of the spring freshets. This dam is released during the drive as soon as it fills, being immediately closed and permitted to fill again. Under good conditions, the dam can be released every three or four hours. By means of this, intermittent freshets may be secured to transport the logs to Tupper Lake. For this, the time required is approximately 25 days on Cold River and 2 - 3 weeks on Rackett River. The logs are then sorted and boomed on Tupper Lake.



## II

Sorting Booms  
at Tupper Lake.



The logs this year it is estimated will all have been decked by March 10. The drive will have begun two weeks later, requiring 55 men, a cook, helper, and a foreman. These men are chosen from the three company camps. The average cost of driving is \$0.50 - \$0.75.

-- Men--

The foreman receive \$75.00 per month and 10% on all sales from the store. At Seward Brook the articles sold were as follows: smoking and chewing tobacco, socks, handkerchiefs, mittens, pipes and some underwear. The other articles needed are secured from headquarters.

Woodsmen receive \$40.00 per month and board working from about 3:30 A. M. until 5:00 P. M. They are supplied with two blankets by the company. Usually 60 men to a camp, for this has been found to be the most economical.

The cook receives \$55.00 monthly and is supplied with two helpers, called cookees, who receive \$40.00 per month.

There are two blacksmiths, who are kept busy all the time. Bunks are provided for them in the blacksmith shop.

Teamsters receive \$5.00 per ~~day~~ (with teams) when they feed their own teams and \$3.50 when the horses are fed by the company. The horses are kept in pasture all summer. During skidding season, they are worked only half days, so as to be ready for the great strain of the hauling season. Teams cost about \$400.00 and last only about 4 years in the woods. Afterwards the horses are sold as draft horses.

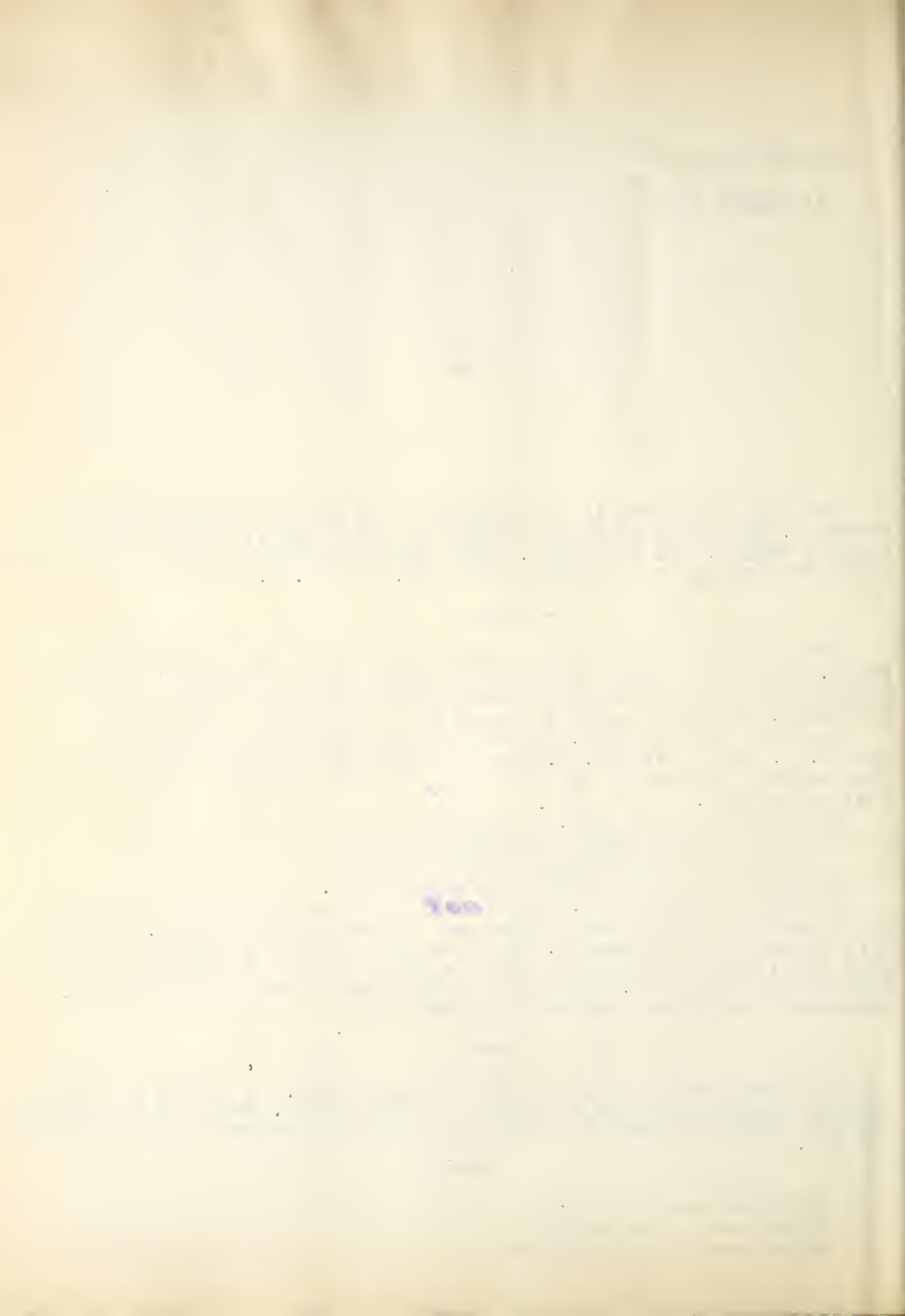
--Board--

This camp boards their men at a minimum cost. No coffee is used thus eliminating the use of milks to large extent. The cost of boarding the men depends somewhat on the cook, averaging between \$0.50 - \$0.60 per day.

--Meals--

Breakfast ----- 3:30  
Dinner ----- 10:30  
Supper ----- 6:00 P.M





## Inventory

January 31 1916

| Article          | Quantity    | Article     | Quantity    |
|------------------|-------------|-------------|-------------|
| Bran             |             | Mustard     | 6 pounds    |
| Feed             | 7900 pounds | Nutmeg      | 1 "         |
| Cats             |             | Oat meal    | 100 "       |
| Hay              |             | Kerosene    | 15 Gallons  |
| Allspice         | 9 "         | Onions      |             |
| Apples dried     |             | Peas        | 125 pounds  |
| Apples green     |             | Pepper      | 3 "         |
| Baking powder    | 30 "        | Pie filler  | 15 "        |
| Beans            | 125 "       | Potatoes    | 400 "       |
| Beef fresh       | 50 "        | Pork        | 2 "         |
| Butter           | 45 "        | Prunes      | 50 "        |
| Bolougne sausage |             | Raisins     | 60 "        |
| Cabbage          |             | Rice        | 20 "        |
| Carrots          | 100 "       | Salt        | 56 "        |
| Cinnamon         | 2½ "        | Soda        | 10 "        |
| Cloves           | 2½ "        | Sausage     | 22 "        |
| Crackers         | 40 "        | Soap        | 75 cakes    |
| Currants         |             | Soap powder | 44 pounds   |
| Fish m           | 175 "       | Sugar       | 125 "       |
| Flour            | 1½ "        | Syrup       | 125 gallons |
| Ginger           | 1 "         | Tea         |             |
| Ham              |             | Tomatoes    | 24 quarts   |
| Lard             | 90 "        | Turnips     |             |
| Macaroni         | 35 "        | Vinegar     | 20 gallons  |
| Mince meat       |             | Yeast cakes | 27 packages |
| Molasses         | 25 gallons  |             |             |

The system of book keeping does not provide for an itemized expense account, Logging and driving are listed as follows:

|                      |               |
|----------------------|---------------|
| Buildings and Roads  | \$0.85 per M. |
| Felling and Skidding | 2.85          |
| Bobbing and Hauling  | \$2.28        |
| Equipment            | .52           |
| General Expense      | .50           |
| Total woods expense  | 8.00          |

|                        |                        |
|------------------------|------------------------|
| Driving to Tupper Lake | \$0.50 - \$0.75 per M, |
| Cost of Toting         | \$0.75 per cwt.        |

A report is made each week of the logs skidded. The skidding report for the week ending December 26 is as follows:

|   |        |
|---|--------|
| Total number of logs on the skids         | 47,625 |
| Total number of logs skidded for the week | 2,925  |
| Total number of logs sawed for the week   | 2,945  |
| Total number of logs scaled for the week  |        |
| Number of men in camp:                    |        |
| Foreman                                   | I      |
| Clerks                                    |        |
| Scaler                                    |        |





|  |                  |
|--|------------------|
| Cook and Helpers                       | 2                |
| Barn and Whores                        | 1                |
| Sawing                                 | 11               |
| Skidding                               | 7                |
| Bolling and Guttering                  | 24 $\frac{1}{2}$ |
| Blacksmith                             | 1 $\frac{1}{2}$  |
| Filers                                 | 1                |
| Cutting Roads                          | 9                |
| Sliding                                |                  |
| Building Skidways                      |                  |
| Toting                                 | 1                |
| Sick                                   |                  |
| Chopping Tops                          |                  |
| Total                                  | 59               |
| Horses in Camp:                        |                  |
| Skidding                               | 5.8              |
| Toting                                 | 1.7              |
| Bobbing                                |                  |
| Trailing                               |                  |
| Making Roads                           | .3               |
| Barn                                   | 2.3              |
| Old River Drive                        | .3               |
| Slide                                  |                  |
| Total                                  | 10 $\frac{1}{2}$ |
| Time lost for week                     | 1 day            |
| Total days worked by the skidding crew | 5                |
| Men gone                               | 15               |
| Men arrived                            |                  |



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THE LOGGING OPERATION  
OF THE  
SANTA CLARA LUMBER COMPANY.

Reported By Crew C:

C. E. Simpson

L. D. Dunn

H. E. Richards

\*\*\*\*\*

February 7 - 11, 1916.





1.

THE LOGGING OPERATION  
of the  
SANTA CLARA LUMBER COMPANY.

The logging operation of the Santa Clara Lumber Company is located in the Spruce Region of the Northeast. In the heart of the Adirondacks among the most rugged mountains of the North Woods, there are situated four camps which comprise the working units of this company. Geographically, this location is within the boundaries of Franklin County, New York state.



*Preston Pond-Camp 2.*

The adjacent lands are owned by the state and private corporations in large holdings. The McIntyre Iron Co. owns



considerable holdings adjacent to the Santa Clara Operation and in order to avoid trespass, the logs have to be hauled across the ponds to the landing making the operation dependent on the stability of the ice. The famous Axton tract is located nearby and the area is within the Adirondack Reserve. The typical forest of this region is practically a pure spruce stand with a small percentage of balsam and a scattering of hard woods. It is very uniform and has a dense growth.



*Attaching the Barienger to a Two-sled.*

The Santa Clara Lumber Company is one of the largest companies operating in this region and their organization includes a very large selling department. Two years ago, this company purchased the old Norwood plant and completely re-modeled it. About 30,000<sup>ft</sup> feet is logged annually and



this amount is driven each spring down the Raquette River to Tupper Lake. About half of this amount came from the holdings of the company last year.

Probably a more interesting company could not be studied. Not only is negative forestry practiced but also strong positive forestry. The Santa Clara people are ardent supporters of conservative lumbering. In 1906, they established a nursery of sixteen beds in which were raised White Pine,



*Roll Skidway*

Scotch Pine, Norway Spruce, and Red Spruce seedlings. The following year the capacity of the nursery was increased one hundred percent and a new species, Western Yellow Pine, was added. In 1908, the number of beds was increased to fifty. During the spring of this year, the two-year old





seedlings were all transplanted except 25,000 Scotch Pine which were planted out directly. In the spring of 1909, 50,000 transplants were planted and the following year, 6,000 more were set out. Two plantings were made in 1911 making a total of 64,000 transplants and in 1912, two plantations - one of 38,000 and one of 63,000 - were started. The first sale to outside interests was made in 1913, when 10,000 White Pine seedlings were disposed of at two dollars per thousand. The nursery also shipped 65,000 Norway Spruce seedlings to the Suracuse Forest School at one and one-half dollars per thousand, and a co-operative system was inaugurated for the exchange of seedlings. And this same year, 41,000 two-year White Pine seedlings were transplanted and twenty new beds added to the nursery. Practically all the barren and burned-over tracts of the company are now planted up and the company feels that it is a paying investment.

The woods operation was laid out by the Woods Superintendent, several of the Camp Foremen, and the Chief Scaler. These men estimated the timber by "looking" and depended upon their experience for accuracy. Due to the fact that they were very familiar with this timber, the results obtained were fairly satisfactory. The average log runs seventeen to the thousand. This over-head crew also estimated the cost of the



various parts of the operation as follows:

| Estimated Cost - 1915-16 |              |
|--------------------------|--------------|
|                          | per Standard |
| Buildings and Roads      | \$0.17       |
| Cutting and Skidding     | .656         |
| Hauling and Bobbing      | .57          |
| Equipment                | .104         |
| General Expense          | <u>.100</u>  |
| Total                    | \$1.60       |

This estimate was a little low due to a severe January thaw which held up the operation for two weeks. The actual cost will run about \$1.75 per Standard.

The Headquarters Camp of the Santa Clara logging operation known as Camp No. 4, is twenty-four miles northwest of Tupper Lake. This camp is used as headquarters for the cleark, tote teams, supplies, etc. It is also used as the half-way camp and is a general utility station.

Seven miles farther into the mountains lies Camp No. 2 in charge of Foreman Echer. This camp is one of the working units and it is a typical snow logging operation as found in the North Woods. The camp proper was built last fall and





and consists of the following log buildings:

|                     |                             |
|---------------------|-----------------------------|
| Office              | 14 x 16 feet                |
| Blacksmith Shop     | 14 x 16 "                   |
| Stable              | 26 x 30 "                   |
| Stable              | 26 x 42 "                   |
| General Store House | 15 x 17 "                   |
| Bunk House          | 24 x 38 "                   |
| Cook Shanty         | 24 x 38 " plus 18 x 18 Feet |
| Cook's Store House  | 13 x 13 "                   |

The cut last fall was 200 acres and the log scale totaled 3,240 thousand. There were 54,270 pieces measuring 16,200 standards. The average acre ran 16,200 feet, B. M.

The camp was constructed on a small level bench above the pond and a little more than one acre had been <sup>le</sup>ch<sup>^</sup>ared. The buildings were roughly built of logs but were comfortable. The roofs were first laid with roof-boards over which was placed a layer of tar paper. It was then covered with a layer of bark and poles were laid on top with the slope of the roof. The buildings are all one-story cabins built of Spruce logs and chinked with moss. The stables, bunk house, and cook's shanty are each ventilated by two vertical wood ventilators near each end of the roof at the gable.



In the main, the camp is comfortable, though not elaborately, equipped. Box heating stoves are used in the office, bunk house, and cook's shanty. Two small heaters are employed in the office and near the entrance in the cook's shanty, while a large stove of the same type is set up in the center of the bunk house. One large, six-holed range with



*Interior of the  
Bunk-house.*

a water boiler at the back is used for cooking and baking. This stove, according to the cook, is insufficient and hampered the work of preparing mess. In the other camps on the operation, the cooks are supplied with two ranges to accommodate the same number of men. A mess outfit for seventy men is furnished the cook and this includes a varied assort-



ment of cooking utensils as follows:

- 100 granite plates and cups
- 75 knives, forks and spoons
- 5 boilers (40 qt.)
- 9 teapots
- 9 water pots
- 10 lamps (3 lamps to a table)
- 5 fry pans (square) 2 ft. by 16 in. by 3 in.
- 1 fry pan (square) 2 ft. by 19 in. by 6 in.
- 2 bean pots ( 10 and 14 qts.)
- 36 soup dishes
- 20 bread pans
- 1 meat saw
- 1 meat axe

There is one bed in camp used by the foreman in the office. Beds and furniture are practically an unknown quantity. The sleeping quarters in the bunk house are very crowded. The bunks are built in three tiers with three and a half feet of space between each tier. They are six (6) by four (4) feet and accommodate two men. By actual measurement, each man has about 125 cubic feet of air space not taking into consideration the possible gas and smoke from the stove and the steam from drying clothes. No arrangements are made for washing clothes





but a crude drying rack is suspended over the heating stove.

The sanitary conditions <sup>q</sup>were very poor even for a cold climate but they are no worse than the ordinary camp of the Northeast. There are two latrines, one of which was situated close by the cook shanty and was even on higher ground. Six camp pigs are utilized as scavengers, and numerous wallows are scattered about the various buildings.



*Moose Creek.*

The drinking water is secured from a small stream which is located below the level of the stables although up hill from them. Although not probable there is a possibility of stable drainage seeping into this stream in case the dip of the rock formation is contrary to the general topography.



The men are governed by no regulations except one relative to intoxicating beverages. No intoxicants are permitted in camp and this rule is rigidly enforced. No camp doctor is employed and no health service has been instituted. The company is also very negligent in respect to care of the camp. The buildings are never cleaned except the stables. No attempt to clean out is made from one season's end to the other.

Like all other modern arrangements in lumber camps, welfare work has not been introduced into the camp and no means are taken to make the camp life pleasant for the men.

The camp store is located in the office being in charge of the foreman who gets a ten per cent bonus from the company for all he sells. He uses a very simple system in keeping the accounts. A ledger book is used to enter all sales and the foreman then transfers all sales to the company weekly account and report sheets. The company also permits peddlers to canvass the camps and they have a credit system arranged for the men. For this privilege, they charge the peddler ten per cent on all sales. On their own books, they credit the amounts to the men and forward a check of the total to the salesman when he goes out of the woods.

The list of goods includes, principally the following





list of commodities:

Wearing apparel

Pants, socks, caps, mittens, rubber shoes, etc.

Tobacco and pipes

Household medicines and patent cures for  
common complaints

The prices of these goods are twenty to thirty per cent higher than outside prices but the men are more than willing to patronize the camp store because it is very convenient in every way.

The camp commissary is kept in the rear of the cook's shanty. It is kept in stock by the tote team. A large supply of stock is kept at camp No. 4 but the tote teams are continually hauling from Tupper Lake.

An inventory of stock is taken on the last day of each month and the following inventory of Preston Pond Camp, No. 2, taken on January 31, 1916, is an insight into the character of grub used in the camps:

Oats      Bin 16 x 3 x  $1\frac{1}{2}$  ft.

Hay      1250 pounds  
+ + + + +

All-spice       $5\frac{1}{2}$  pounds

Bak. powder      42      "

Beans      225      "



|            |                        |
|------------|------------------------|
| Butter     | 22 pounds              |
| Bologna    | 50 "                   |
| Cinnamon   | $2\frac{1}{2}$ "       |
| Cloves     | 2 "                    |
| Crackers   | 20 "                   |
| Currents   | 5 "                    |
| Fish       | 25 "                   |
| Flour      | $5\frac{1}{2}$ barrels |
| Ginger     | $3\frac{1}{2}$ pounds  |
| Lard       | 180 "                  |
| Macaroni   | 37 "                   |
| Mince meat | 15 "                   |
| Molasses   | 5 gallons              |
| Mustard    | 6 pounds               |
| Kerosene   | 50 gallons             |
| Onions     | 90 pounds              |
| Peas       | 100 "                  |
| Pepper     | 4 "                    |
| Pie filler | 100 "                  |
| Potatoes   | 500 "                  |
| Pork       | $4\frac{1}{2}$ barrels |
| Raisins    | 10 pounds              |
| Rice       | 90 "                   |



|               |             |
|---------------|-------------|
| Salt          | 38 pounds   |
| Soda          | 8 "         |
| Sausage       | 25 "        |
| Soap          | 100 cakes   |
| Soap powder   | 72 pounds   |
| Sugar         | 300 "       |
| Syrup         | 2 "         |
| Tea           | 15 "        |
| Tomatoes      | 2 gallons   |
| Vinegar       | 4 "         |
| Yeast cake    | 37 packages |
| Dried peaches | 25 pounds   |

On List But No Data:

Beef, dried apples, cabbage, milk, carrots,  
oatmeal, prunes, ham, nutmeg, turnips.

The cook bakes 20 to 30 loaves of bread daily and makes  
60 quarts of tea per meal. No coffee is used in the camp.  
The complete menu for one day is as follows:

Breakfast - 3.30 A. M.

Oatmeal, sugar, milk

Beef-stew potatoes





Bread, butter (oleomargarine)

Tea drop cakes

Dinner - 9.30 A. M.

Beef, pork, and beans

Potatoes

Bologna

Soup

Bread and butter

Pie

Cake

Tea and milk

Supper - 5.00 P. M.

Beef stew

Potatoes

Beans

Bread and butter

Jelly cake

Drop cake

Tea and milk

The several cooks of the camps are paid an annual bonus for giving the best and most satisfactory grub at the lowest price. This competition results in efficient utilization of



food stuffs and a very low ration cost. The cost of grub per man varies from thirty-nine to sixty cents per day.

There are two stables in the camp accommodating thirty-eight horses but at the time there were only thirty-one horses in camp. The horses are fed oats and hay, each driver feeding and watering his team. The water is carried from the



*A Loaded Two-sled*

stream in buckets. The horses are well cared for - more attention being paid to the stables than the bunkhouse - and they were in good condition. Very good horses are used valuing from one hundred and fifty to two hundred and fifty dollars a head. Two tote teams relay supplies from town to headquarters camp to the woods camp. The tote teams make daily trips which besides being very convenient, keeps the road open.





The blacksmith shop is equipped with only the necessary tools and accessories common to the ordinary type found in the North Woods. It is used for all repair purposes and the blacksmith is indeed "the jack of all trades".

The foreman is in full charge of the camp and receives seventy-five dollars per month. He keeps account of the business and reports of the camp and runs the "van". For this latter service he receives a ten per cent bonus on all goods sold.

Three scalers are employed during the cutting season for the entire operation. These men have permanent positions working wherever needed after the annual cut is scaled.

One cook, one cookee, and one flunkie are employed to take care of the cook shack. The cook is paid fifty dollars per month and has full charge of the mess.

A stable boss is named from the drivers and he also acts as the veterinary. He is the highest paid driver and directs the work connected with teaming.

A lobby-hog is employed and he tends the fires, carries the water, cleans the stables and does all the odd jobs about camp, receiving thirty dollars and board for his services.

The principal factor in locating and laying out a tote road in this operation is the grade. The road is laid out with



the idea of maintaining an even grade and little else is taken into consideration. Each fall the tote road is repaired and put in shape for winter and it seldom attracts any attention until the following fall. The estimated cost of toting goods to Camp No. 2 is 40 cents per 100 pounds.



*Crew breaking trail on Tote road.*

The felling operation is confined to fall. Two men do the cutting but usually two fellers are combined in one crew bossed by a head feller and with two guttermen doing the swamping. The fellers first notch the tree with a single bitted axe and finish cutting with a four-tooth saw. To prevent binding a two inch by four inch by three-fourth inch iron wedge is used and this is driven into the cut with the



head of the axes. They then buck the trees and lop the tops. The gutterman swamps from each tree to the skidway for both pairs of fellers. A horse is also added to each crew being used by the guttermen. The logs are skidded to the rollways where they are scaled and marked. The skidding crew is made up of a single horse, two guttermen or swampers, and one roller or skipper. Grabs are used to form trains of logs, one to four logs being taken per trip, and the trail for this work is cut three feet wide. Four hundred logs are placed on the average skidway which is located for a down hill haul and permits easy loading on the two-sleds.

One hundred and twenty-five to one hundred and fifty logs are cut per crew day on the two-man basis. The logs are cut into even lengths from 12 to 16 inches for pulp wood, longer for timber and odd lengths, for special markets. During the hauling season, five hundred logs are loaded per day from the skidways.

The loading is done by a crew of four men assisted by the driver who stands on the load and guides the logs into place with a peary. Two men roll the logs and place the supports while the other two feed and break down the skidways.

Fifty to seventy-five logs are loaded on each two-sled which is then braked by two Bariengers down two steep hills.





At the foot of the second hill the road turns off on the lake. It is at this point that the adjacent land of the McIntyre Iron Company interferes with the road making it necessary for the Santa Clara Lumber Company to follow the ponds to the landing in order that trespass may be avoided.



*Filling the Sprinkler which ice the  
road to landing.*

Several years ago, the Lidgerwood Manufacturing Company made an attempt to introduce steam logging into this region. The Santa Clara Company gave them all the assistance in their power but it was a dismal failure. A skidder was set up on the operation and an experienced engineer was placed in charge. Many new arrangements of rigging and operating were tried. Every possible method was attempted before the Lidgerwood



people gave it up. But finally they took out the skiäder and admitted that steam logging was impractical in the steep Adirondack country.

There is one slide on the operation but it is only of a temporary character and used only when conditions are ideal. It is merely the natural course of a bobbing road where the logs are chuted to shorten the bob haul. The side of this



*Transferring the Barienger Brake  
to a new location.*

slide is so steep that a Barienger brake is absolutely necessary to control the bobs. The slope is very excessive and even the drag of the logs on the bob road will not brake the load. Where there is danger of the logs leaving the road, the latter is banked up with log barricades. Owing to the





typography of the road the logs were successfully chuted to a more gradual slope. From this slope the bobbing teams make rapid and efficient trips to the two-sled road skid-way. The following data illustrates the efficiency of the bobbing



*Bob sled load near the skidway.*

of this haul:

Crew:

Four men on the rollway

One driver

One team

One foreman

Distance of bobbing haul - 450 feet



|                       | time       |
|-----------------------|------------|
| Up with team and sled | 13 minutes |
| To load               | 9 "        |
| Down                  | 4 "        |
| Unloading             | 4 "        |

Total time for one trip 30 minutes.

The steepest and higher slopes are bobbed and the more gradual and lower slopes are two-sledged. The hauling is



*The landing at Preston Pond.*

systematic and efficient. A compass survey was made of the two-sled road, all distances being paced. The hauling distance of the two sleds totaled 11,375 feet - over two miles.

At the landing, the logs were loaded on to the ice to await the spring break-up. A large dam with a needle gate is



built here. The dam is typical of the region and the framework is constructed from timbers cut in the adjacent forest, while rocks and sand are used to complete the structure.



*The log dam at Preston Pond.*

All the logs are driven down the Racquette River to Tupper Lake. This river is ideal for this method of transportation. It is naturally swift. During February in the coldest part of the winter, the channel remains open - the water is so swift that freezing is impossible.

Each year some little blasting is necessary to clear the





eliminate jams. Slight repairs are also made on the dams, levees, etc.

The drive is conducted by the Santa Clara Lumber Company but it is a union drive including the logs of other owners who use the river for transportation. These owners pay the Santa Clara people on the total cost and share basis.



*Sluiceway and log drive.*

A crew of seventy-five men is used. The logs are splashed over shallow sections of the river and are driven to Tupper Lake where they are sorted and separated by booms. The logs are identified by the usual marking system and towed to the proper mills about the lake shore. A single log boom connected by grabs and chain is used. The clerical system of the operation



is efficient although technically crude. \_\_\_\_\_

\_\_\_\_\_ Each foreman takes care of the reports at his camp during the logging season and permanent records and reports are taken care of by the head bookkeeper who is stationed at Headquarters Camp. The company used special prepared forms for all reports and have a book-keeping system which was developed to suit their needs.



*Work for the "follow up crew".*

The crew was not enabled to see the drive or the mill in operation. In winter, the lakes freeze over and the work at the mill has to be suspended. All the mills of the Northeast close down during cold weather for this reason.

The woods operation is typical of others in the same





section, probably no better and no worse. The laborers, principally French-Canadians, are hardy, energetic workmen who are born lumber-jacks. They receive on the average about thirty dollars per month and board.



*Snow plows used on  
the roads.*

*The 1916 State Foresters  
at head camp.*

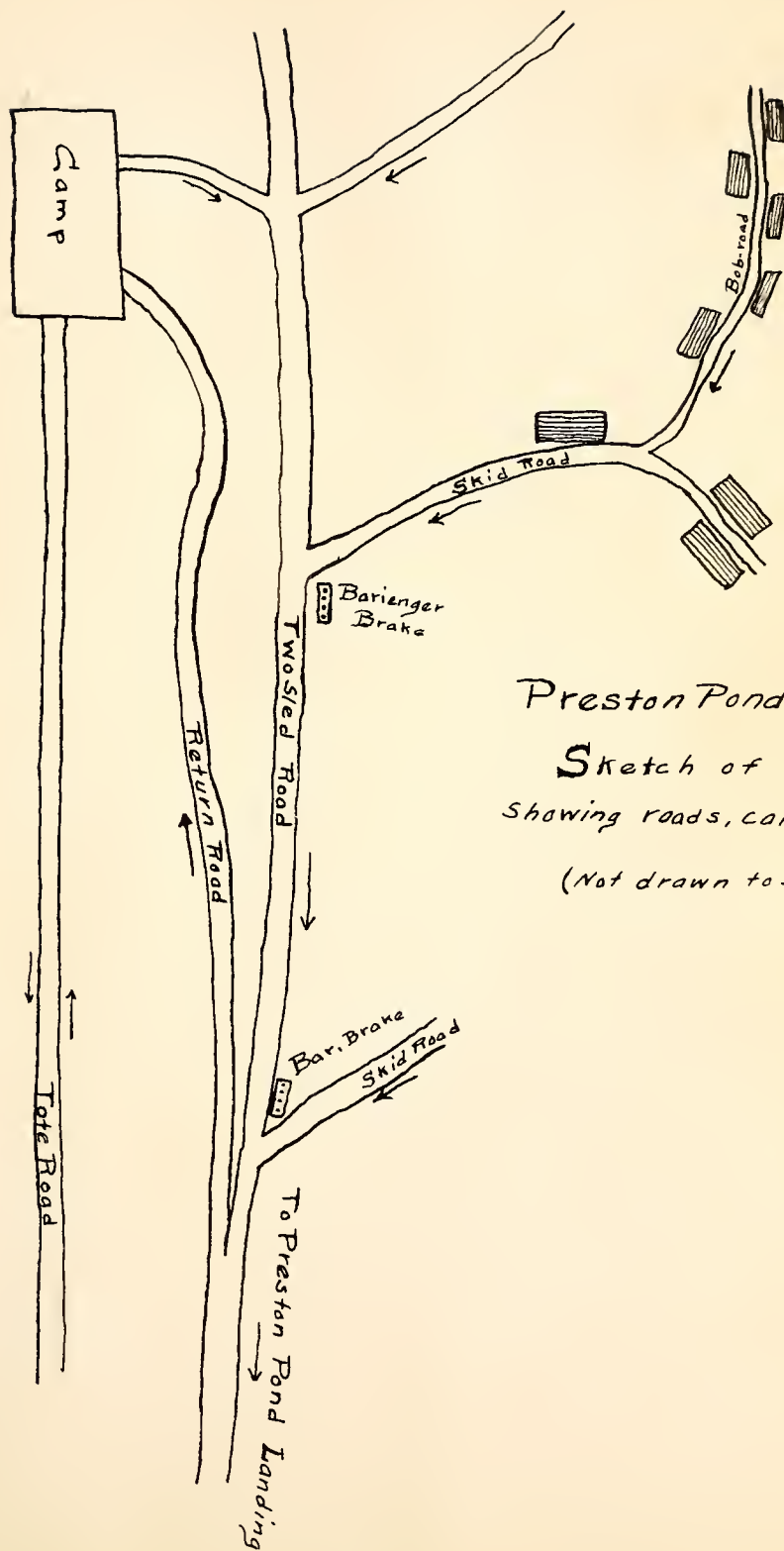
*Beiter - Cowley - Riddel - Makibbin -  
Watkins - Dunn  
Johns - McCartney - Ballou -  
Simpson - Shed - Richards.*



The thanks of Crew C are due to Foreman Picker and his men who were always willing to answer all questions and always tried to make the stay of their student visitors at Preston Pond, pleasant and profitable.

Crew C: Simpson  
Dunn  
Richards





Preston Pond Camp 2.

Sketch of Operation (in part)  
Showing roads, camp, Bariengers etc.

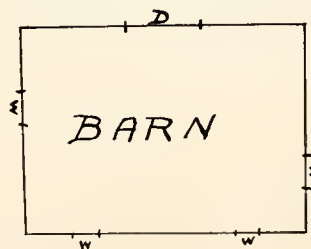
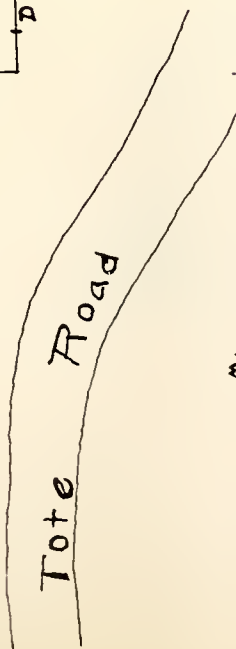
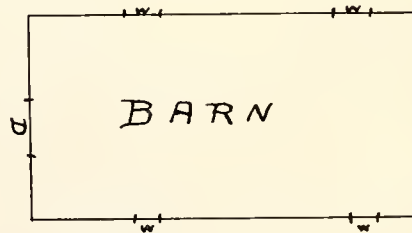
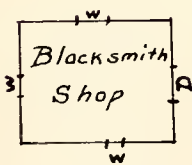
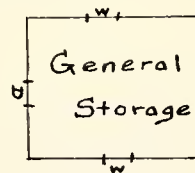
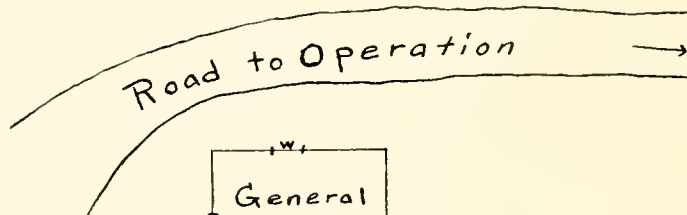
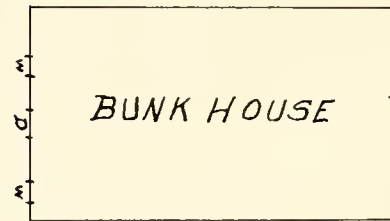
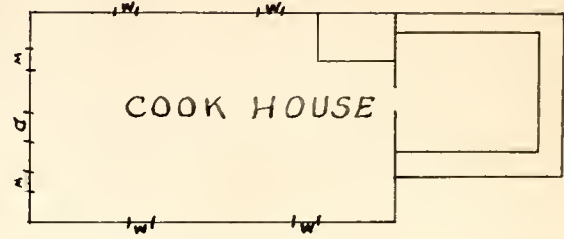
(Not drawn to scale)

Crew "C".



SANTA-CLARA LUMBER CO.

CREW 'C':  
Simpson  
Richards  
Dunn



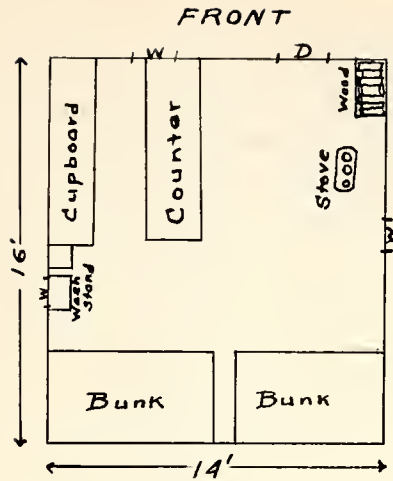




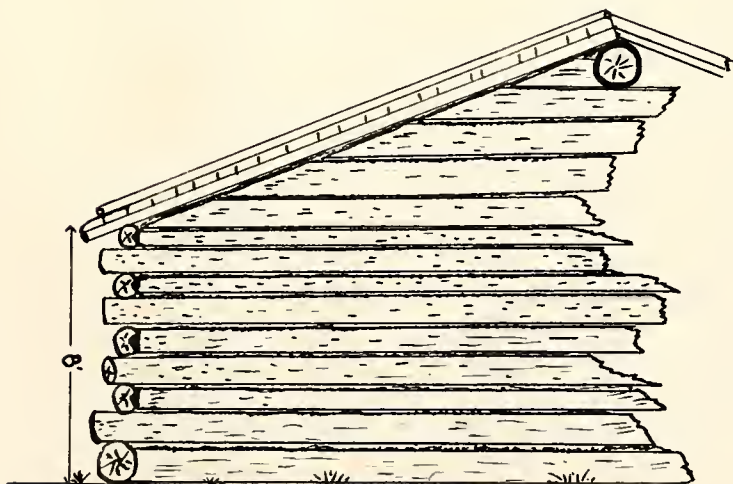
# Office - Floor Plan

SCALE - 1" = 8 ft.

CREW "C".



## Detail - Log Camp Corner



Cracks chinked  
with moss.

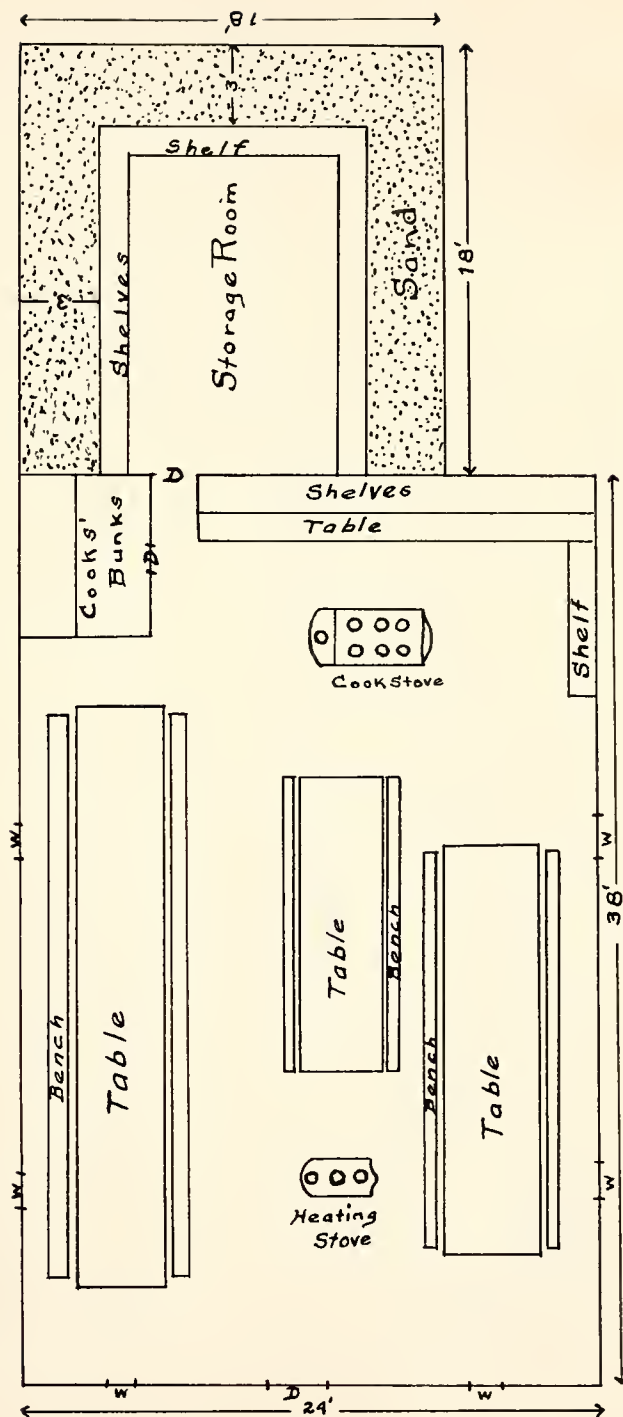
Roof - boards, tarpaper,  
bark; poles laid on top.



# Floor Plan - Cook House

CREW "C",

Scale 1"=8ft.



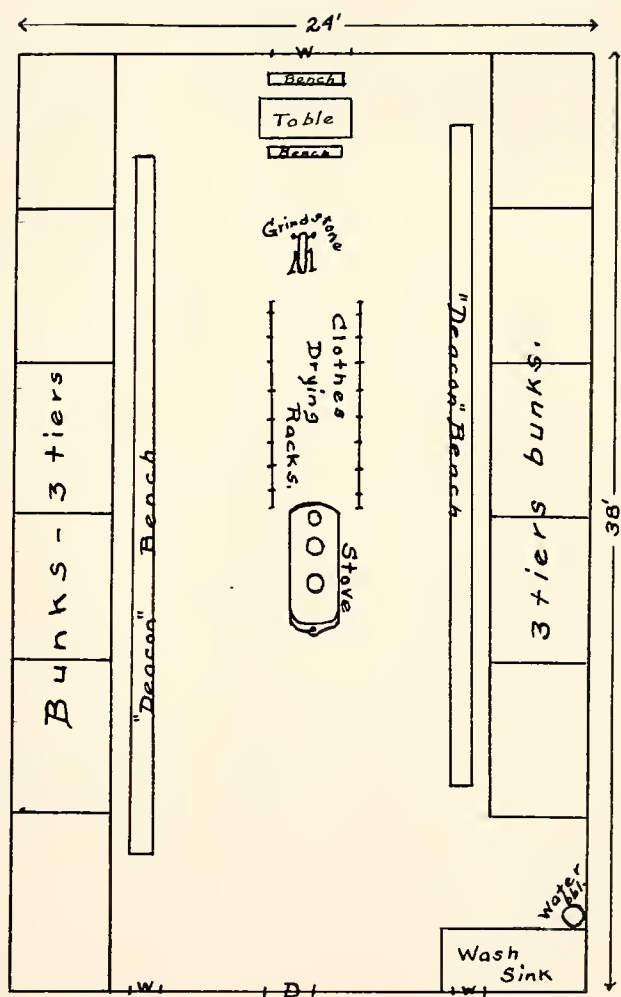




# Floor Plan - Bunk House.

CREW 'C'

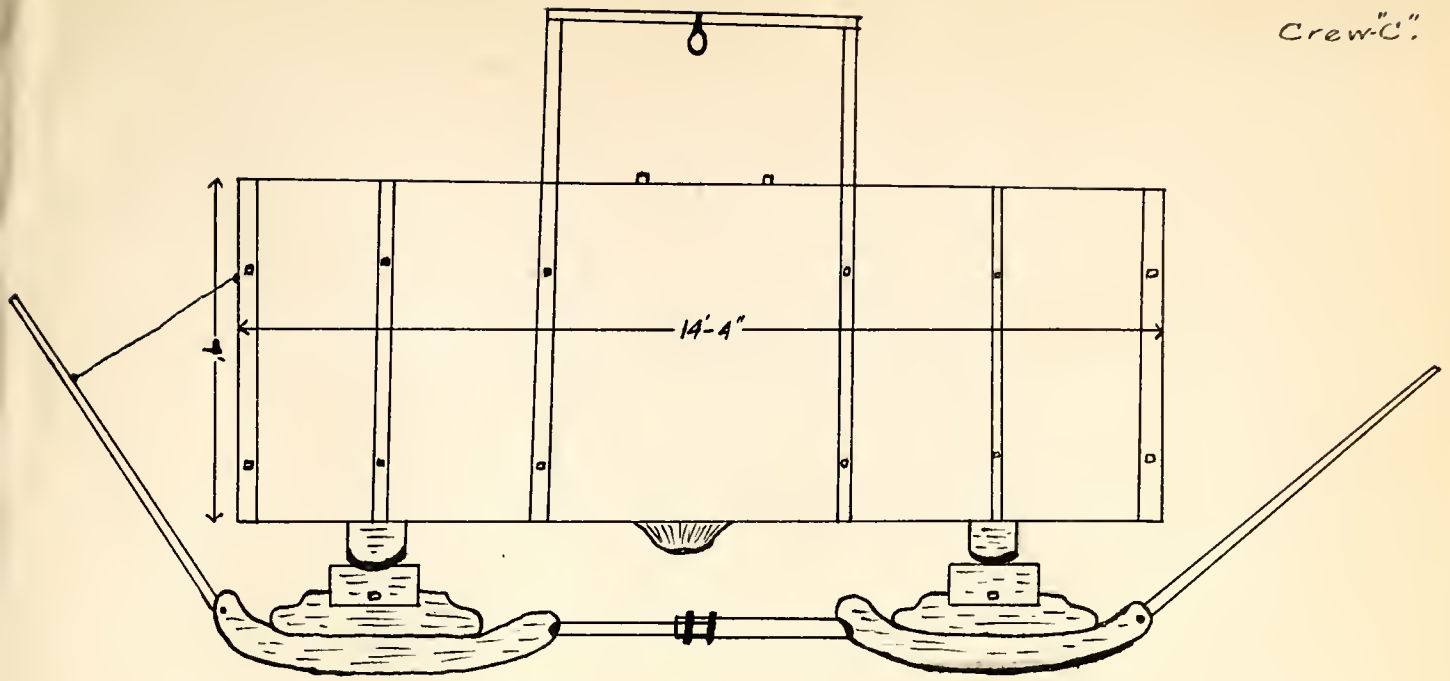
SCALE-1"= 8 ft.



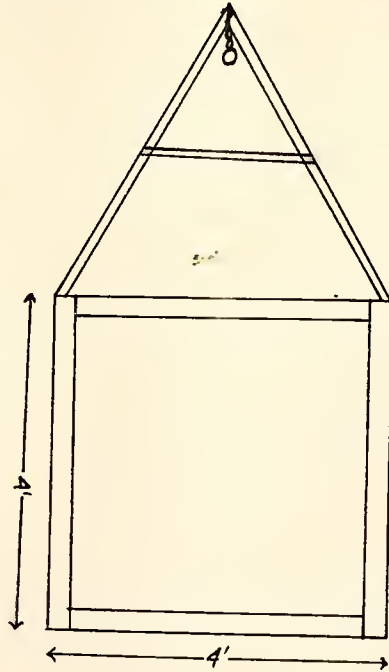


# Sprinkler

Scale 1" = 3 ft.  
Crew "C".



End View



Capacity - 6334 gals.

Loaded by skid and bbl -  
by team from pond thru ice.









Penn Van Basket Company.

Penn Yan, N.Y.



This plant is owned by Guile & Windnagle, the same company controlling the plant at Gaines, Penna. This factory makes various sizes and shapes of baskets, for different purposes. The principal baskets made are pint and quart baskets for different kinds of berries. They are made as, covered diamond weave splint baskets; common splint baskets; bushel and half-bushel baskets and grape baskets.

The logs used by this company are bought from farmers woodlots in Pennsylvania. For the most part they are beech, but birch, maple and elm are also used. When the baskets have solid bottoms almost any kind of hardwood and sometimes hemlock is used.

Most of the boxes and baskets are sold locally to fruit and berry grovers or else shipped down the lake country to other points. A large part of the product goes to Hammondsport N.Y. When the boxes are shipped they are fitted inside of each other so as to take up the least room. When the baskets have lids on they are made in four sizes so that they will fit inside of each other. In this way one dozen large baskets are shipped with three dozen smaller ones inside of them. If the baskets have handles they are shipped with the handles so as to economize on space. The handles are made of elm and are cut

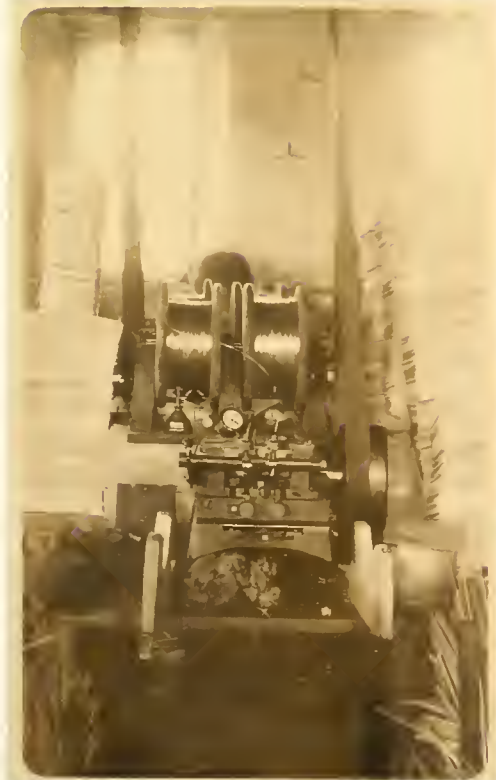


out in strips  $3\frac{1}{16}$ " wide by means of a three band saw. The saw generally cuts handles from stock 24" long,  $\frac{3}{4}$ " thick and 4" wide. They also cut 29" long,  $1\frac{3}{4}$ " thick and  $\frac{1}{2}$ " wide. These last pieces are for berry box crates. Sides for heading from #100 to #150 are also cut,  $1\frac{45}{64}$ " by  $\frac{1}{2}$ " by  $\frac{3}{8}$ " for the #100 and 29" by  $1\frac{3}{4}$ " by  $\frac{1}{2}$ " for the #150.

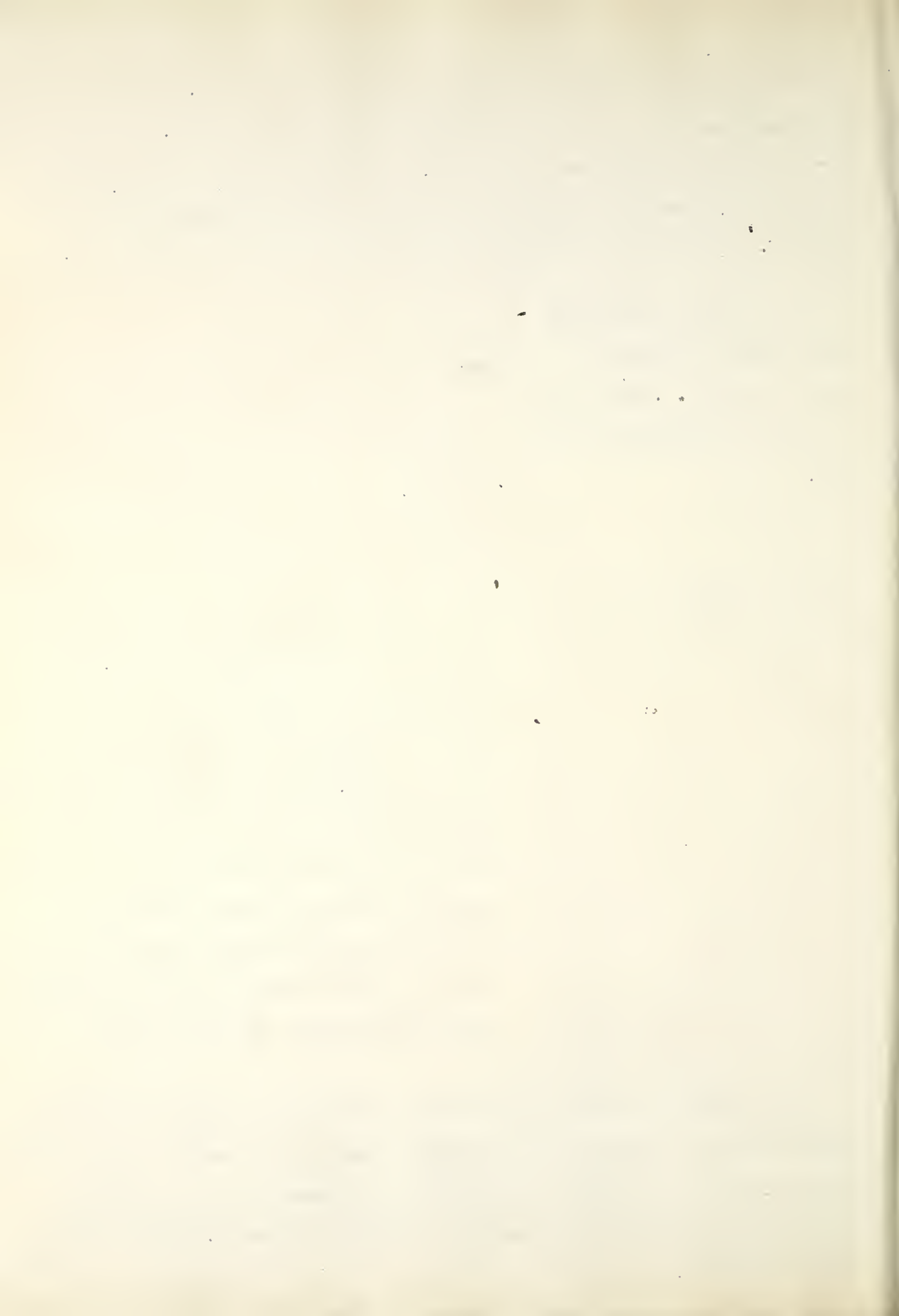
The view at the side shows where the girls make the berry baskets at the rate of 2000-3000 per day.



This view shows one of the machines seen in the above general view. The girls work at these machines all day and are generally on their feet most of the time. Chairs or rather stools are provided but they are rarely used as this is all piece work and the operators cannot turn out as many baskets if they sit down at their work. The atmosphere in this room is always damp and the splints used are always wet.



The handles are cut by a whipsaw machine which also rounds the edges. They make whoops for the #100, 2 bushel,  $2\frac{1}{6}$  bushel and 3 bushel baskets. When the handles are cut they are passed to the punching machine and holes are punched one inch from the ends. Square headed nails are used.





All machinery for these operation is made by the Coe Mfg Comp-  
any, Painesville, Ohio.

The berry boxes are dried in a dry-kiln heated by a forced draft of hot air. They are left in the kiln for 24 hours. The kiln has a capacity of 25,000 baskets. The kiln was made up of a series of wire holders or swings hung on an endless chain at each end. The chain was arranged so that there were four layers of swings one above the other. These small boxes were shipped in open crates. All other baskets except the small hand baskets were air dried.

There were two men employed in the packing and shipping departments and oak lumber was used for the crates. The mill has a capacity of 200,000 berry boxes a day and they bring \$.50 per 100 boxes. They receive \$1.40 per dozen for 5/8 bushel peach baskets. The workers get \$.25 per dozen and they can turn out six to nine dozen per day. They can make 200 to 250 twenty pound grape baskets and get \$.10 for each 100. They make 3000 15"x 15" heads per day for the 150 pound boxes. In nailing these together they use a Morgan Nailing Machine.

The cores of the logs from the veneering machine are split up and sold for fuel. One to one and a half cords brings \$2.50.

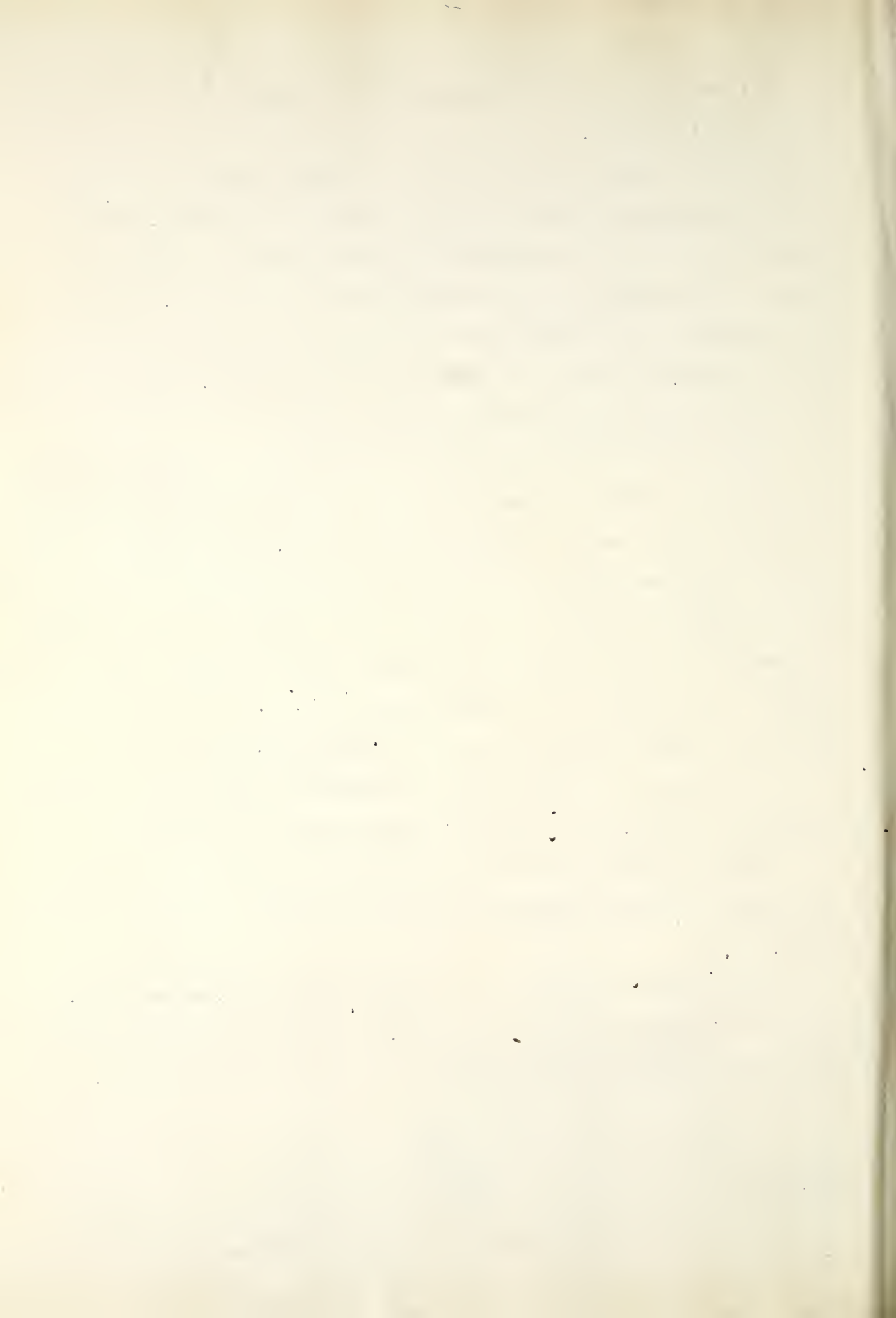
A small circular band saw is used for cutting the bolts for veneer, and a circular saw and carriage is used for cutting the other bolts.

The engines were made by the Slater Engine CO. Warren, Mass., and were capable of producing 150 hp. The boilers were made by the Atlas Engine Works, Indianapolis, Indiana, and were 100 hp. each.

Feb. 1914.

13+

J. J. Wheeler  
H. A. Trappe



Asaph State Nurseries.

Marsh Creek, Penn..

On our way to Galetown we stopped at Marsh Creek to look at the state nurseries and get some ideas on nursery work as conducted by the State of Pennsylvania.

The nursery proper covers about 13 acres of ground but just at present only about 8 acres are set out to seedlings. Six of these acres are made up as seed beds. The species being planted are white and red pines, European larch, Douglas fir, beech, oaks, and some other hardwoods.

The instruments used here are spades, shovels, rakes, 3 automatic machines for planting, planting boards of the Yale type, and other necessary tools for this kind of work.

From this nursery both seedlings and transplants are sold. In 1913 2,500,000 seedlings were shipped from here. About 70 % of these were white pine. They also sell about 1,000,000 transplants per year.

The seeds are sown in beds 4' by 50' and 4' by 60'. Sowing is done both by drilling and by broadcasting, but the drill method is the one most used and 7 rows running lengthwise are put in a bed. A small wheel hand drill is used for drill planting. These beds are cultivated by a small three-pronged hand cultivator.

The first year the seedlings are covered by a mulch, before freezing sets in in the fall. This mulch is composed of pine needles and broad-leaves. In the spring the mulch is removed by means of a long toothed rake, care being taken so as not to destroy the seedlings. The mulch material is saved for use the following year.

European larch is the first species to be taken out in the spring and should be taken out of the beds as soon as possible. European larch is very easily winter killed. In transplanting both the Yale and



the Beech boards are used with the Beech board doing a little better work.

One man can weed 41 beds per day, while in transplanting one man can plant 48 crossrows. They generally transplant one year seedlings. Planting begins April first or near that time. About 25 men are employed at the nursery during the busy season. About 60% of the seedlings and about 40% of the states transplants are shipped from this nursery.

The number of seedlings in the beds are determined, when broadcast, by placing a wooden frame over the bed that is one foot square and counting the number of seedlings in the square and then estimating the number of seedlings in the bed by this count. All seedlings are sold at cost.

Between the beds are paths 18" wide and they run both ways.

The nursery is aiming to have  $\frac{2}{3}$  of the area in transplants and the other  $\frac{1}{3}$  in seed beds.

The mulch when removed from the beds is left in the paths for a while in order to kill the weeds. Some of the red pine observed were higher and it is supposed that these came from stronger seed than the others.

After visiting the nursery we walked out to a plantation where white pine had been used to cover a denuded slope of 33 acres. The area was planted in 1910. Some larch was also planted. Near this plantation was a plantation of scotch pine which was set out in 1909 and covered about 300 acres. The loss since planting was only about 11% due to the attack from brown and wooly aphids. A nicotine and whale oil spray was used in fighting them. The average height of the trees was 4' to 6'. They considered the best mixture for planting to be white and red pine and norway spruce.

*J. V. Trapp*





R.M. Whitney Hub Company.

Galetton, Penna.

This concern was engaged in turning out hubs from birch, particularly black and yellow birch. They use birch because it does not check as badly as other woods and when it does check there is generally only a single check which will close up in time if the wood is left out in the air to season.

The costs of this operation are as follows.

\$2 per thousand for transportation.

\$3 " " " stumpage.

\$5 " " " jobbers.

The birch logs are rolled into the mill and placed on a flat truck and chained down at one end. The truck is then moved up the required distance to cut the proper length and the blocks are cut off by means of a swing saw. The length of the bolts vary in size according to the size of the hub they are turning out.

The next operation is to bore a hole thru the bolt by means of a boring machine. This machine is operated by one man. The bolts then go to a rossing machine where the bark and outer layers are rossed off and the hub is turned to shape. Three men are required in the operating of this machine, one of the men supply the bolts. The machine is rather complicated in that it bores the hole and shapes the hub at the same time, all in one operation.

From the above machine the hubs are taken to another machine where the holes for the spokes are bored. These holes are bored automatically by the machine. First there is a hole bored where the spoke is to be and then a set of chisels automatically dig out the holes. The same man that runs the above machine also runs a machine that further smoothes the hub and the holes. The mortiser on the



on the machine for punching holes can turn out 400 sets of large hubs and 600 sets of small hubs in one day.

The hubs are next placed in a steam kiln and kept there for twenty-four hours. From here they go to the storehouse where they are left for about a year before being shipped. The floors of this storehouse are open so as to allow for a free circulation of air.

#### Wages, Prices &c.

The man sawing the logs into bolts gets \$2 per day.

The man operating the mortiser gets \$2 per day.

A set of the large hubs sell for \$8 a set.

The hubs are sold mostly in the west. The wheels for the famous 20 Mule Team Borax wagons are built around this hub.

The best spokes for wagons where this hub is used are made of hickory which comes chiefly from Tennessee.

Many men in the Hub business lost money by moving their plants south and trying to make hubs from oak. They found that "oak" hubs checked so much more than "birch" ones that that the business did not pay.

Feb. 1914.

B

J. J. Wheeler.  
T. H. Trappe.



*Galeton*  
~~Campbell's~~ Stave and Heading Co.

Galeton, Pa.

This mill was situated at the other end of Galeton from the mill and kindling factory and we visited it the same afternoon as the others.

In the process of making staves and heading only beech, birch and maple was used. The timber used was of a low quality and was cut into small bolts by a drag saw. Three men work at each drag saw, one to raise and lower the saw, one to place the bolts into position and one to take them away. There were two of these drag saws in use just now. The small bolts next went to the slashers. The bolts were cut into 18" lengths and two drag saws can cut 80 cords of these a day.

The bolts were next taken to the slashers who placed them on a swinging bar and forced them through a circular saw. This cut the bolts up into thin boards or slabs 9-16" in width but they are finally planed down to 7-16 of an inch. There were four machines and two men actually working at the machine. One pushed the bolts thru the saw and the other, sitting below the saw, caught the slabs as they fell and piled them. Then there were helpers who brought the bolts to the machines and those who carted them away on barrows. Before being piled to go thru the kiln the slabs are planed on one side only, giving it a thickness of 7-16".

The boards or slabs are next piled on trucks to be sent thru the kiln. These trucks or cars are piled with these slabs by two men. The slabs are not laid on flat but overlapping so the slabs can dry out more readily. Each car when loaded held about six cords of slabs. The kiln was heated to a temperature of 200 degrees F.



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There were three of these kilns and each car remained in the kiln about 7 days.

After the boards have been dried they are removed from the kiln and taken to the heading room. In the heading room the boards are first edged by a jointer and then sorted out by the sorter who then hands them over to the turners. The turner takes the board, places them in a circular clamp and turns out the heads. A man beneath the machine catches them as they fall and piles them. When he has forty heads in a pile they are removed and constitute a bundle. These go to the tailer who places them in a large clamp or press. This is tightened and the bundle is bound up by three wires. Then they are either loaded directly on the cars or stacked in the room. The output of this room is about 400 bundles a day. A car will hold about 500 bundles and they ship about 4 or 5 cars a week. Use 60 cords of wood a day.

In the heading room were the following machines and men:- two jointer machines with two men at each machine; four matchers, two turning machines and two turners; two tailing machines with two tailers. There were also helpers to load the bundles in the cars and to remove them and store them if desired. The wages of these men averaged \$2.10 to \$2.25 a day. In the heading room there was a total of 20 men.

Each machine can turn out 20 bundles of heads an hour. The output daily was composed of about 5,000 sets of 9" heading and 4,000 sets of 16" heading. They can also fill orders for heading from 9" to 20". One cord of green bolts will make 100 heads 17 1-8" in diameter.

In the mill there is altogether about 60 men. The wood is obtained from a tract near Galeton and they have enough to enable them to run another year. They have another plant at Hollow, and



and larger holdings in the south which comprises about 43,000 acres.

The heading made by this concern goes principally to the Atlas Cement Company and they fill large contracts for that concern. The Worcester Salt people also obtain much heading here.

TB + 11

C. J. Wheeler

T. F. Trappe.



# Brooklyn Cooperage Company.

Tupper Lake, N.Y.

This company operates a mill just outside of Tupper Lake, manufacturing "heading" and "staves". The product is used principally for sugar and flour barrels and for nail kegs.

The logs are brought to the mill on cars and dumped into a small pond. This mill uses about ten carloads of logs per day. The mill has a capacity of 1,000,000 ft. B.M. per month or 12,000,000 ft. B.M. per year. This company owns two mills of about the same capacity and together they use about 24,000,000' B.M. per year. The principal species used here are; -beech, birch, ash, elm, and maple.

The logs are drawn up out of the pond by a "bull chain" and carried on to the deck. A moving chain on the deck keeps the sawyer supplied with logs. At the end of the transfer chain is a series of live rolls, controlled by the sawyer, which enable him to place the logs in the proper position to be cut into bolts. When the logs are ready to be cut they are gripped by a pair of steel jaws which are supplied with long sharp teeth, so that the log cannot slip or turn, and a huge circular "drop" saw cuts the bolts of the required length. The length of the bolts are from 32" down. The large 32" bolts are pushed across one corner of the dock to a point where they are placed on a small carriage and quartered and these quarters are then piled on trucks. These trucks are then run into the steam kiln and steamed for 24 hours. From the steam bath they go to the stave machined. In the stave room the pieces are first rossed of their bark. This is done by hand and the bark is piled on cars and burned. There are two stave machines with a capacity each of 100,000 to 110,000 staves per day. The staves are loaded on large four wheeled trucks and hauled to the drying sheds by horse power. They remain in this shed for six weeks





to two months. There are 18 joiners where the staves are shaped. At the present time only 8 or 9 were working. After the staves are joined they are placed in bundles by a boy. Each bundle contains enough staves to build three barrels.

The smaller bolts are taken direct to the heading machines. There are two heading machines and one planer. The slabs drop down on an endless chain which carries them to the dry shed where they are piled and sent into the dry kiln. These machines have a capacity of 3,000 sets of heading per day. The dry kiln is an air shed and not steam.

There are fifteen steam rooms at the plant with a capacity of nine cars each. One is left empty at the close of each day and is loaded first the next morning. The night work requires an additional force of three men to take care of the kilns.

At The present time there were 100 men working at the mill and in the summer time the force is increased to 125 to 140.

There is a separate engine for each part of the works, making a total of five engines. The engines were built by the Erie City Iron Works and McEwan Bros. Wellsville, N.Y.

The waste in this mill is disposed of in the following ways; some of it is used as fuel at the plant; some of it is used to supply the demand of the local market for fuel and the rest is sold to the Tupper Lake Electric Company for fuel.

Feb. 1914.

B

J. F. Wheeler.  
T. H. Zerbe.



Work up instructions for handling plots after  
germination and manner of making counts.















## Great Northern Paper Co.

SPRUCE WOOD DEPARTMENT

## HORSE TRANSFER SLIP

Operation \_\_\_\_\_ Date.. \_\_\_\_\_ 19\_\_

Horses received from \_\_\_\_\_ this day \_\_\_\_\_

No. . . . . Description \_\_\_\_\_

Horses Shipped to \_\_\_\_\_ this day \_\_\_\_\_

No. . . . . Description \_\_\_\_\_

Clerk. \_\_\_\_\_

This report must be made out on the same day that any horses are received from or shipped to any operation or place and sent by first mail to the Bangor office.

## HORSE LABOR REPORT

Operation \_\_\_\_\_

Camp \_\_\_\_\_

|    |  |  |  |  |  |  |  |  |  | Total |
|----|--|--|--|--|--|--|--|--|--|-------|
| 1  |  |  |  |  |  |  |  |  |  |       |
| 2  |  |  |  |  |  |  |  |  |  |       |
| 3  |  |  |  |  |  |  |  |  |  |       |
| 4  |  |  |  |  |  |  |  |  |  |       |
| 5  |  |  |  |  |  |  |  |  |  |       |
| 6  |  |  |  |  |  |  |  |  |  |       |
| 7  |  |  |  |  |  |  |  |  |  |       |
| 8  |  |  |  |  |  |  |  |  |  |       |
| 9  |  |  |  |  |  |  |  |  |  |       |
| 10 |  |  |  |  |  |  |  |  |  |       |
| 11 |  |  |  |  |  |  |  |  |  |       |
| 12 |  |  |  |  |  |  |  |  |  |       |
| 13 |  |  |  |  |  |  |  |  |  |       |
| 14 |  |  |  |  |  |  |  |  |  |       |
| 15 |  |  |  |  |  |  |  |  |  |       |
| 16 |  |  |  |  |  |  |  |  |  |       |
| 17 |  |  |  |  |  |  |  |  |  |       |
| 18 |  |  |  |  |  |  |  |  |  |       |
| 19 |  |  |  |  |  |  |  |  |  |       |
| 20 |  |  |  |  |  |  |  |  |  |       |
| 21 |  |  |  |  |  |  |  |  |  |       |
| 22 |  |  |  |  |  |  |  |  |  |       |
| 23 |  |  |  |  |  |  |  |  |  |       |
| 24 |  |  |  |  |  |  |  |  |  |       |
| 25 |  |  |  |  |  |  |  |  |  |       |
| 26 |  |  |  |  |  |  |  |  |  |       |
| 27 |  |  |  |  |  |  |  |  |  |       |
| 28 |  |  |  |  |  |  |  |  |  |       |
| 29 |  |  |  |  |  |  |  |  |  |       |
| 30 |  |  |  |  |  |  |  |  |  |       |
| 31 |  |  |  |  |  |  |  |  |  |       |

Remarks:

# MEAL REPORT

Operation \_\_\_\_\_

Camp \_\_\_\_\_

|    | Regulars |   |   |  |  |  | Transients |   |   | Total |
|----|----------|---|---|--|--|--|------------|---|---|-------|
|    | B        | D | S |  |  |  | B          | D | S |       |
| 1  |          |   |   |  |  |  |            |   |   |       |
| 2  |          |   |   |  |  |  |            |   |   |       |
| 3  |          |   |   |  |  |  |            |   |   |       |
| 4  |          |   |   |  |  |  |            |   |   |       |
| 5  |          |   |   |  |  |  |            |   |   |       |
| 6  |          |   |   |  |  |  |            |   |   |       |
| 7  |          |   |   |  |  |  |            |   |   |       |
| 8  |          |   |   |  |  |  |            |   |   |       |
| 9  |          |   |   |  |  |  |            |   |   |       |
| 10 |          |   |   |  |  |  |            |   |   |       |
| 11 |          |   |   |  |  |  |            |   |   |       |
| 12 |          |   |   |  |  |  |            |   |   |       |
| 13 |          |   |   |  |  |  |            |   |   |       |
| 14 |          |   |   |  |  |  |            |   |   |       |
| 15 |          |   |   |  |  |  |            |   |   |       |
| 16 |          |   |   |  |  |  |            |   |   |       |
| 17 |          |   |   |  |  |  |            |   |   |       |
| 18 |          |   |   |  |  |  |            |   |   |       |
| 19 |          |   |   |  |  |  |            |   |   |       |
| 20 |          |   |   |  |  |  |            |   |   |       |
| 21 |          |   |   |  |  |  |            |   |   |       |
| 22 |          |   |   |  |  |  |            |   |   |       |
| 23 |          |   |   |  |  |  |            |   |   |       |
| 24 |          |   |   |  |  |  |            |   |   |       |
| 25 |          |   |   |  |  |  |            |   |   |       |
| 26 |          |   |   |  |  |  |            |   |   |       |
| 27 |          |   |   |  |  |  |            |   |   |       |
| 28 |          |   |   |  |  |  |            |   |   |       |
| 29 |          |   |   |  |  |  |            |   |   |       |
| 30 |          |   |   |  |  |  |            |   |   |       |
| 31 |          |   |   |  |  |  |            |   |   |       |
|    |          |   |   |  |  |  |            |   |   |       |

Remarks:

Total Days Board \_\_\_\_\_





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